THE

PRACTICE OF INSTRUCTION

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A MANUAL OF METHOD GENERAL AND SPECIAL

EDITED BY

JOHN WILLIAM ADAMSON, B.A.

PROFESSOR OF EDUCATION IN KING'S COLLEGE, LONDON

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PREFACE

The present work is designed in the first place to be a tool for the craftsman, for the teacher, or the novice who is learning to teach in primary or in secondary schools; but it is hoped that certain features of the book will also possess value for the layman who is interested in the practical tasks of the schoolroom. It will be found, for example, that a large place is accorded in Part I. to the consideration of foreign ideas concerning method and curriculum, while in Part II. the contributors on method in its application to the different branches of study frequently appeal to foreign practice; in both Parts the short bibliographies which conclude the several sections contain references to German, French, and American works, as well as to writings by our fellow-countrymen. The presence of this foreign feature is not to be accounted for by any blindness to native excellences nor to a merely wanton admiration for whatever is foreign; it is due to the conviction that practice is the more intelligent the more extended is the practitioner's horizon and the greater the field within which 'trial and error' operate. Some at least of the problems which foreign educators are endeavouring to

solve are not peculiar to themselves, but are fundamental for humanity at large ; a study of foreign practice therefore may be made helpful to the teacher, administrator, executive official, and indeed to all who ponder educational questions. Again, while the book may be described as concerned on the whole with the established curriculum, both of the primary and of the secondary school, it has been thought advisable in the interest of the student of education to call attention to sundry experiments in curriculum and in method from which results of great importance may be expected in the future. Reforms in method which are now in general use are sympathetically described.

That portion of the book which some readers may regard as 'theoretical' (the use of the term is deprecated in this connexion) is modern in the sense that it tries to reflect the present-day studies of authorities in the mental sciences concerned ; and it is hoped that it is actual in the sense that it bears directly upon the practical problems of the class-room. It is, in short, a statement of the general principles underlying the 'practical' Part II. which follows it. Here more particularly is a territory common to primary and to secondary schools of all grades.

With the important exception named below, Part II. includes a consideration of the teaching of those various branches of knowledge which make up the established course of studies. The editor's colleagues, as it will be generally recognised, are especially qualified by experience to write on their respective topics. They do not attempt an exhaustive treatment which virtually leaves nothing to the independent thought of the

teacher ; their aim rather is to state the principles which each writer for himself regards as vital within his own subject, and to accompany the statement of principles by sufficient detail to illustrate their application.

Absolute unanimity of opinion on all points is scarcely to be expected amongst a body of ten collaborators dealing with a varied field ; its presence would not necessarily argue vitality. Such unanimity has not been striven for in the present case ; but it is nevertheless believed that there are very few (if indeed any) fundamental contradictions. One point of view common to all the writers consists in an appreciation of the merits of the traditional curriculum, coupled with a belief that for the most part we have not yet learned how to make the very best of that curriculum as an instrument of education, and that further, this established course of studies is not the only desirable one for all boys and girls. More particularly the writers are agreed that a humanist element is a necessary one in the curricula of all schools, not excepting the humblest, and that as a consequence literature, ancient or modern, is as vital to the soundness of a school curriculum as is some branch or aspect of mathematics or of natural science.

It has been found necessary to omit consideration of such indispensable parts of a school education as physical training, drawing and all kinds of manual work, singing and arts generally. It was felt that no sufficient treatment of these was possible without the employment of such a volume of diagrams and the like illustrative matter as would swell the bulk of the whole work intolerably. Still, a short discussion of the principles underlying instruction in the arts,

whether for practical or æsthetic reasons, has been attempted in the fourth section of Part I.

Acknowledgment is here made to the kindness of the Delegates of the Clarendon Press in permitting the reproduction of the diagrammatic maps in Dr. Herbertson's article on the teaching of geography; to Messrs. Meiklejohn and Holden for the like kindness in permitting the reproduction of the diagrams which illustrate Mr. Baker's article on the teaching of mathematics; and to the editors of *The School World* for the use by Mr. W. H. S. Jones in the present work of an article written by him and published in their periodical in July 1904.

The Index has been compiled by my friend and colleague, Mr. Albert A. Cock.

J. W. ADAMSON.

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LIST OF CONTRIBUTORS

PART I. GENERAL METHOD AND CURRICULUM

The Editor

PART II. SPECIAL METHOD

SECTION I. RELIGIOUS INSTRUCTION.

A. C. Headlam, D.D., Principal, King's College, London.

SECTION II. THE MOTHER-TONGUE.

The Editor.

SECTION III. GEOGRAPHY.

A. J. Herbertson, M.A., Ph.D., Reader in Geography in the University of Oxford.

SECTION IV. HISTORY.

M. A. Howard, Med. and Mod. Lang. Tripos (late Secretary Historical Association), Southwark Secondary School.

SECTION V. MATHEMATICS.

A. H. Baker, B.A., F.R.A.S., Basnett Road School, Lavender Hill.

SECTION VI. NATURAL SCIENCE (including Nature Study).

T. Percy Nunn, M.A., D.Sc., Vice-Principal, London Day Training College ; C. von Wyss (Nature Study), of the same College.

SECTION VII. LATIN AND GREEK.

W. H. D. Rouse, Litt. D., Head-Master, Perse Grammar School, Cambridge, and W. H. S. Jones, M.A., of the same School.

SECTION VIII. MODERN LANGUAGES.

W. Mansfield Poole, M.A., Senior French Master, Royal Naval College, Osborne.

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THE

PRACTICE OF INSTRUCTION

PART I

GENERAL METHOD AND CURRICULUM

SECTION I

MENTAL SYSTEMS

Instruction is the name given to the teacher's share in the process, or processes, through which his pupil acquires knowledge or habits or skill. These processes are primarily and essentially the work of the learner himself, but it is the province of instruction to facilitate them. For example, the activity of the pupil's mind, and the consequent formation of knowledge, depend upon the character and abundance of the raw material of knowledge offered for his consideration, and upon the relative order in which its several portions come before him; and these things fall within the scope of the instructor's task. So, too, skill is consequent upon an apprenticeship wherein 'trial and error' play an indispensable part; but it is the business of instruction to abridge this period by affording models and carefully devised exercises for the pupil's imitation. The instructor is a middleman between the intelligence

or capacity of the learner and the stuff out of which knowledge is to be made or the circumstances whence skill is to be produced. It follows that he should at least know what is the general character of the operation of that intelligence which it is his office to guide. It is proposed to consider in this section the psychological groundwork of the teacher's task as this is conditioned by the mind of the pupil.[1]

Consciousness.—The subject-matter of psychology is, simply, consciousness, a thing more easily indicated than defined. It is usual to enforce the significance of this term by the use of one or more figures, of which perhaps the most pertinent is that of 'the stream.' Our consciousness of ourselves and of the world about us is said to be a process comparable with a stream. The latter is, in the first place, continuous : there are no absolute gaps in its course, though the water may here be deep, there shallow, now running swiftly, now slowly. Standing upon a bridge and looking up stream and down, the river impresses us as not merely continuous, but as being a unity, a whole ; the Thames is the Thames, whether beheld to-day or twenty years ago. Yet possibly not one particle of water seen from a river bridge at a given moment was in sight at the same spot an hour before. Change is as much a character of a stream as is continuity.

The instability of consciousness is particularly well figured in the advance of a wave, where water, which at one instant is borne upon the crest, in the next sinks to the body of the roller. In like manner, one object of thought may be securing for itself well-nigh the maximum of consciousness, there being but an obscure awareness of other objects ; any one of the latter may, however, on occasion become prominent for consciousness and

[1] See also Section iv., below : 'Habit.'

change places, so to say, with the former, as when the attention of a reader absorbed in his book is suddenly diverted by the remembrance of a duty still unperformed.

The continuity, wholeness, change, and instability of a stream are apt figures of the like attributes of consciousness. Yet for purposes of study it is necessary to set bounds to the stream, so that attention may be focussed upon what lies between these. Such artificial boundaries enclose what is called 'a state or moment of consciousness.'

Constituents of Consciousness.—The method of investigation which lies most open to the psychologist consists in the observation of his own 'states of consciousness,' and a very simple analysis of any one of these discloses, to those who will undertake such self-examination, the presence of various constituents within the state, as feelings, impulses, volitions, 'perceptions,' 'images,' &c. But such an exercise of introspection does not reveal the *elements* of consciousness; any one of these constituents when scrutinised proves to be a combination, not a true element. The point is of first-rate importance in the psychology of intellect, and deserves illustration.

Suppose the mind to be conscious of some external object, either as a thing seen or heard; the very brief pause involved in the effort to attend to this 'percept' (to use the technical term) is straightway followed by the suggestion of other qualities possessed by the object than the visible or the auditory. The sight of an orange is readily reinforced by the thoughts of its solidity, weight, particular response to touch, its smell, and its taste. The mind does not stay at the purely sensational stage of seeing or hearing the object, but forthwith proceeds to interpret these experiences of sense in terms of *past* experiences. The same kaleido-

scopic power comes into play when a former percept is revived by memory or conjured up by fancy. The 'mental image,' as such a revival is called, does not long remain itself; either new aspects of the thing appear, or the image is attended by other images which have formerly occupied the focus of consciousness in its company. Percept and image are both based upon sensation, which is no element, but a synthesis of physical and psychical occurrences. A stimulus from some external object falls upon the sense-organ fitted to receive it, is transmitted to an appropriate nervous centre, and thence to the higher centre in the brain, and consciousness (in this case a 'sensation') follows.

Similarly, a 'general notion' or 'idea' (*e.g.* 'justice,' 'poverty,' 'government') is not elementary in its nature, but compound; 'feelings,' whether of pleasure or of pain, are never feelings simply but are inseparably associated with objects. Volitions are not simple impulses to act, or merely actions; they include the idea of an end to be accomplished.

Mental Systems.—The synthetic activity of consciousness which is thus illustrated by the nature of its individual constituents is even more evident when examination is directed to conscious *processes*. Take, for example, 'judgment,' the process whose formal expression in words is the 'proposition' of the logician stated by means of 'subject,' 'copula' and 'predicate.' 'All thinkers are liable to error' is no mere aggregation of subject-term and predicate-term, but the establishment of a definite relationship (symbolised by the copula 'are') between them, the objects designated by the former being, in this instance, brought into the system of things which are 'liable to error.' Again, consider the process of recollection. In remembrance, the form of memory which we tend to regard as normal, the revival of past experiences appears to go on without

effort, image or idea following its like in a way which seems spontaneous. But a check may arise, as when a name or an approximate date refuses to 'come.' Effort is excited in consequence; but we cannot recollect by sheer force of will alone. All that can be done is to attend steadily to suggestions as they occur, dismissing what seems irrelevant, and obstinately keeping hold of a promising clue. Recollecting means seeking to recall a mental system of which the missing object and the suggested objects are members.

Recollection is a particularly apt instance of the point under illustration; failure to recollect and success in recollecting both show that the tendency is to preserve states of consciousness as *wholes*, and not as disparate elements. The meaning of this is that synthesis or system is characteristic of consciousness itself; the mind is an organism, not an accumulation of disconnected odds and ends. Mental life as a whole as well as its individual states, processes and single constituents is a synthesis or system more or less well co-ordinated. Mental activity, from this point of view, is expended in the making of systems; the function of intelligence is systematisation.

The syntheses thus formed must necessarily preserve a certain partial independence, or they could not be systems; but if it be a true description of mental activity to say that it is systematisation, then this independence can only be partial. The tendency must be for minor systems to coalesce in a higher system, and so on.

The unity, and consequent suggestive force, of these minor syntheses is illustrated by the paradoxical self-consistency of dreams, by the ability to hum the tune of a song whose words are forgotten, by the action of a child who reads aloud to himself in order to keep the thread amidst distracting circumstances. There is an

old story of a woman living in a lonely cabin, who remembers on getting into bed that she possesses but one solitary lucifer match. Her mind intent upon to-morrow's fire, the paralysing thought occurs, What if the match should fail to strike! The picture of the future thus called up dominates her mind entirely. Leaving her bed, she goes to the matchbox, and puts Fortune to the touch by striking the match there and then!

Their Activity.—The system which is in possession of consciousness for the moment interprets, or at least tends to interpret, incoming sense-impressions, images, and ideas in the sense most in accord with itself. By their reception the system in its turn undergoes some modification, small or great. On the other hand, there is a tendency to dismiss or ignore whatever refuses to be favourably interpreted. The activity of consciousness lies in such attractions and repulsions. The fact explains how it is that men will accept as compatible with each other statements which an unprejudiced observer (or an observer suffering from a different prejudice) regards as quite incompatible. This is the explanation of the failure of honest disputants to understand each other, or even to recognise that they are using the same terms in different senses. Those very instructive mistakes, the 'howlers' of the schoolboy, are, for the most part, examples of the capacity which one mental system has of assimilating minor systems. If an inscription has to be read in a bad light or at a considerable distance, a knowledge of its general purport makes a world of difference in the reader's success. Contrariwise, an unfamiliar writing, such as some of the Asiatic scripts, is apt to strike one at best as a merely graceful arabesque or at worst as a bewildering confusion.

Its Laws.—The activity of intelligence illustrated in the preceding pages has been described by Paulhan

in two complementary propositions, which he calls the laws of systematic association and systematic inhibition respectively. It will be seen presently that the epithet 'systematic' is essential. He formulates the first in words to the following effect: A mental constituent tends to associate itself with, and to revive in consciousness, constituents which are capable of uniting with it in a common synthesis, because capable of co-operating with it in attaining a common purpose. This is a statement of the proper form of mental activity, that without which intelligence could not be. But systematic association is not the all-inclusive formula for that activity, since the latter also includes the negative mode, called arrest, or inhibition. To revive some constituents in consciousness is to prevent others from appearing. The formation of systems is in its essence a process of selection, a progressive inclusion of some members of the system and the omission of what might have been members under different conditions.

Systematic Association.

Compare the multitude of actual stimulations pouring in perpetually upon eyes, ears, and other organs of sense with the small number which secure attention. The great majority of these potential impressions suffer arrest. The physiologist distinguishes between movements which are the result of a conscious exercise of will, and movements which are 'reflex,' like the involuntary 'blinking' in a flood of light, or the 'start' which follows a loud and unexpected noise. A striking difference between reflex and voluntary actions lies in their respective times of reaction to stimulus. The reflex appears to come without pause, mechanically, fatally, while there is an appreciable interval of time before the voluntary action is initiated as movement. In that interval the phenomena of deliberation and choice arise, and their exercise involves

a check, a negative no less than a positive attitude. Again, consciousness does not hold at one and the same moment all the characters which make up the complex image or idea of a particular person, place, or event present to it at that moment. Some of these characters (*e.g.* the relation of the person to ourselves, our recollection of the place as seen on a winter's day) are then in the very focus of consciousness, claiming our full attention; others (*e.g.* the person's profession or services to his country, the strategical importance of the place in war-time) are absent, although equally capable *on occasion* of systematic association with those present, or with yet other characters of the image or idea. The missing features are inhibited by the point of view, by *the kind of interest* then prevailing.

This fact of inhibition is the ground of the safeguard from ambiguity which is afforded by a context, a 'universe of discourse,' as the logicians say. 'Rent' is a tear as well as a definite sort of payment; but the former sense does not come to mind when the universe of discourse is 'economic charges.' The text-books say that the term 'tear' is an ambiguous one; but the equivocation, if any, in the preceding sentence is not likely to strike the reader on the first reading.

Systematic Inhibition.—The complementary principle to that of systematic association is the principle of systematic inhibition. Paulhan's statement of it is to this effect: Every mental constituent occupying the focus of consciousness tends to prevent the production or development of mental constituents which are not capable of uniting with it in accordance with the principle of systematic association, or it tends to cause the disappearance of such discordant constituents.

Paulhan shows how the growth of a personality illustrates the operation of both principles. Where the personality is eminent there are exceptional attributes,

as the ability to spend years in excessive toil for a single purpose, aptitude for profound reflection, for prompt and original activity. The possession of these attributes implies, amongst other things, arrested tendencies, the renunciation of pleasures, perhaps the sacrifice of health or of life. A character is formed on condition of some deformity, great or small; the unity of personality is gained at the expense of the harmony of human nature as a whole. Thus Charles Darwin at the close of his days regrets his inability to enjoy music and poetry, lost pleasures of his youth.

Analysis.—The objection may occur to the reader that there is no room left for any spontaneous movement of initiation or originality in the conception of conscious life here presented. The objection overlooks the fact that no discussion has been undertaken of the *motives* which induce system-making; such a discussion would hardly be in place in the present section. But the terms 'interest' and 'inhibition' have occurred; and it may be added that under the stress of an interest the connection of even firm associations may be disturbed, systems broken, and new systems constructed from their elements. It is by such a process of analysis or dissociation that classifications, generalisations, and all manner of abstractions are attained; and these are characteristic of intelligence in its higher activities.

There is, however, no paradox involved in the position occupied by analysis. 'The law of dissociation is really only one case of the law of association; it is the multitude of connections which serves to disconnect. The same general principle accounts for both association and dissociation, although the results of its working are opposite in the two cases. When one thing has gone with another it tends to call it up and fuse with it; but when one thing has gone with many different others it will tend to call up each of them a little, and

so none of them fully, and instead of fusing with any one of them, to win an independent existence.' [1]

Analysis and synthesis are complementary. The separate images, notions, &c., which are the outcome of analysis become material for new associated groups or systems. A boy who by quite different ways has reached the several ideas of a mountain pass, an invading army, and a great master of tactics is prepared to associate them in a variety of historical or fictitious connections.

Attributes of Mental Systems.—The unity of personality is the expression of the most comprehensive of mental syntheses ; but within it there is an immense number of minor systems, which exhibit great differences when compared one with another. The most striking difference lies in the massiveness, or scope, of systems—that is, in the number and variety of points of contact which one system has with another, or others. The best illustration is afforded by those subjects of daily attention and exercise which are described as a man's 'practical interests.' The extent and minuteness of a man's acquaintance with the details of his profession, or other constantly recurring occupation, are abiding sources of wonder to the uninitiated lay mind. No less so is the readiness with which the professional man discovers association between his business and things and ideas which seem to others to be foreign to it.

Allied to the quality of massiveness is that of co-ordination, a quality in which systems differ greatly. The excellence of co-ordination amongst the mental systems which concern a man's daily business may co-exist with a very loose sort of co-ordination, or even lack of it, amongst yet other systems of his life as a whole. The professional man who is so alert within his special

[1] Thorndike, *Elements of Psychology*, p. 217, *n.*

province may be a 'stick' outside of it. Almost proverbial is the disappointment following upon the social introduction to a great man under circumstances which, of course, put him off his own stage. The imperfection, or want of co-ordination, of mental systems is manifest in the illogical thought, the inability to follow a connected argument, or to note contradictions which most men exhibit from time to time when they are called upon to deal with unfamiliar matters.

The explanation of these differences between system and system in point of comprehensiveness and co-ordination is the explanation of their differences in point of readiness or of slowness in answering to stimulus. The ideas or syntheses which display the most firmly knit connections, the greatest massiveness or extent, and the quickest response to external prompting are those which have been most frequently repeated in consciousness. And, passing a step further backward in the explanation, their repetition is in direct proportion to the interest which they possess for the mind which has entertained them.

Growth of Systems.—The manner of growth of these mental combinations is, of course, a reflection of the nature of intellectual activity. Incoming perceptions and ideas, the new material for the construction or renovation of knowledge, are modified from the first by the systems of ideas which the learner has already acquired. Of two sense-impressions impinging upon an organ, one may be barely perceived because it has no recognised relation with what is then interesting the recipient, while the other may arouse extensive systems of images and ideas. The new material is accorded the kind of reception which harmonises with the knowledge, tendencies, and practical interests of the individual, and more especially with the particular current in which these are flowing at the moment. The white

grave-stone becomes a ghost in the eyes of the belated and unnerved rustic. In other words, competitors for a place in the man's consciousness must run the gauntlet of a selection, with its consequent omissions. Ideas are not associated by chance, nor even so much by their own mutual affinities, as by the dominant interests of the mind in which they are associated. The idea of the same object is not the same idea for all men, because their tendencies and practical interests are not identical, with the consequence that their perceptions of the thing and the resulting systems are different.

It follows that only infinite mind can perceive all the meaning of a fact, event, or truth. A finite mind, however great, always sees things incompletely, beholding and reflecting what is most consonant with itself. The omissions from a man's thoughts are as significant of the man as are their positive inclusions. Compare what Professor James says of the man who devotes himself to working out some great conception : 'Unutilisable facts may be unnoted by him and forgotten as soon as heard. An ignorance almost as encyclopædic as his erudition may co-exist with the latter, and hide, as it were, in the interstices of its web.' [1]

Systematisation, then, is *the* function of that intelligence which it is the business of instruction to assist. The importance of this fact, as one which must govern the choice of studies and the method of teaching, should be a sufficient apology for a repetition here and in the following sections which otherwise would be tiresome. Instruction misses its mark when it fails to induce the learner to systematise, so far as he is in a position to do so. If it be asked, What is the purpose of the ceaseless systematic association and inhibition which

[1] *Text-book*, p. 295.

constitutes the intellectual process, the reply (already foreshadowed above) is : Action, behaviour ; the end of thinking is doing.

'Association of Ideas.'—In view of much that has been written by way of educational psychology, it seems needful to consider, briefly at least, an account of mental activity different from that here given. Text-books on teaching, of a date not at all remote, used to devote considerable attention to the 'training of the memory,' and in this connection it was the practice of English text-books especially to set forth a longish list of the various forms of association. Thus, there were named, amongst others, association in time (as Henry VIII. and the Reformation), in place (Hastings and William the Conqueror), cause and effect (the refraction of light and the seeming shallowness of a stream), association by similarity (Alexander the Great and Napoleon), by contrast (giant and dwarf). Such an enumeration of associations is a survival of an obsolete or an obsolescent psychological theory. Of the first-rate importance of the phenomena grouped under the term 'association' no doubt exists ; and it may be conceded that there is a practical usefulness in such a list as that given, when it is regarded as the ground of many devices serviceable in the school-room. But the list itself originated in considerations much more fundamental.

'Laws of Association.'—Modern psychologists who think it necessary to treat the phenomena of association as a more or less independent part of their science, or who at least give it a separate handling, no longer encumber themselves with the terminology employed in the before-mentioned list. Forms of association are by them limited to two, Contiguity and Similarity, whose so-called 'laws' are stated in terms to the following effect. The 'law' of Contiguity runs :

'Presentations (*i.e.* objects present in consciousness) and, more generally, experiences which occur together, or in immediate succession, will afterwards tend to suggest one another under the form of memory images.' [1] That of Similarity runs: 'Presentations and experiences tend to call up images of previous presentations and experiences which resemble them.'

The best commentary upon these two so-called 'laws' is furnished by Höffding: 'There is, however, a psychological point of view from which the two laws may be brought under one and the same fundamental law; for, however many different sensations and ideas may come simultaneously, or in immediate succession, into our consciousness, they neither are nor remain quite separate. They are all embraced by one and the same consciousness through whose activity they have arisen. The manner in which they act upon one another and are combined is determined by the form and direction taken by the synthetic activity of consciousness at the given moment. On the other hand, they react, each one of them, upon the general condition of consciousness. Now when one of these sensations or ideas is renewed and brings the others with it, what really operates is the tendency to reawaken the general state to which all these ideas belonged. The innermost basis of all association of ideas should thus be looked for in the unity which is present in every mental state and every mental activity, and which stamps all simple elements with a common characteristic.' [2]

Compare Paulhan: 'So far as I can interrogate my personal experience, when a passage from a book or a musical air causes a feeling formerly experienced to vibrate anew within me, it recalls at the same time

[1] Sully, *Teacher's Handbook o Psychology*, p. 218.

[2] *Outlines*, p. 159.

a notable portion of the *me* which I was at that former time. It is not a detached impression which tends to reappear as an ill-defined sketch, but an old *system* of impressions and ideas, a manner of being and feeling.' [1]

This reduction of the number of forms, or principles, or 'laws' of association from an indefinite quantity to two, or even one, is not to be explained altogether as a movement towards simplicity of conception, or conciseness of statement. The list to be found in manuals of teaching there figures as part of the mechanism of 'memory,' but the psychological theory which gave it birth was the theory that a somewhat fortuitous mode of association is a sufficient explanation of mental activity as a whole.

System a Better Explanation.—It is not the objective nature of the things with which consciousness deals that gives the best and most frequent explanation of their juxtaposition in our minds. The true explanation of the phenomena of association is afforded by the subjective unity which belongs to every state of consciousness. Its parts are co-ordinated and affect each other as the several members of the bodily organism are connected for mutual advantage. This systematic or synthetic quality of intelligence being accepted, the fact of association is easily understood.

'The laws of association' are but partial descriptions of what takes place when one or other of them seems most obeyed. Take a case of association by resemblance, as when the thought of Julius Cæsar suggests Alexander the Great. Clearly, the image of the Roman might suggest any one of a great number of other images—the Capitol, the calendar, 'Omnis Gallia' or Shakespeare's play. Why, of all the many possible

[1] *L'Activité Mentale*, p. 443.

objects, is just the one, Alexander, recalled, *while none of the others comes into consciousness* ? The answer—not contained in the 'law'—is, because none of these others fits the circumstances of the moment—that is, harmonises with the system then present in attaining the end there and then in view. Similarly, when the thought of *a* recalls the thought of *x*, the law of contiguity affords no ground for believing, what is nevertheless the fact, that under different circumstances *a* might be followed by *m* or *b*; nor does either law explain the quiescence of *x*, *m*, and the rest when *b* follows *a*. Not association by contiguity or resemblance, but the principles of systematic association and inhibition, must be invoked to explain the facts; and these principles rest upon the unity of consciousness, whose immediate attitude or direction is determined by the interest of the moment. So James: 'In no revival of a past experience are all the items of our thought equally operative in determining what the next thought shall be. Always some ingredient is prepotent over the rest . . . the prepotent terms are those which appeal most to our interest.' [1]

To advance the two so-called 'laws' of Contiguity and Resemblance as the explanation of mental activity is to ignore the organic nature of the mind itself. A purely associationist psychology is inadequate, since it takes no account of that selective power which is at the back of the principle of systematic association, a principle which the word 'systematic' implies. Professor James describes the last of the four characters of consciousness thus: 'Consciousness is always interested more in one part of its object than in another, and welcomes and rejects, or chooses, all the while it thinks.' [2] So, too, Lloyd Morgan: 'Psychology, so far as I am

[1] *Text-book*, p. 262. [2] *Ibid.*, p. 170.

able to interpret its teaching, proclaims the fact that selective synthesis is the very essence of mental development.'[1]

Apperception.

The conceptions of mental activity and of intellectual function presented in the foregoing pages are familiar in pedagogical writing under the name Apperception, a term which denotes one of the principal ideas of the educational theory of Herbart. Those combinations of mental constituents which have here been called 'systems,' 'syntheses,' are in the Herbartian terminology called 'apperception-masses.' A new impression presented to consciousness—new in the sense that it has, as yet, no place in an apperception-mass—is similarly termed an 'apperceived idea.' Apperception is the interaction between these two.

Assuming that the mind is in possession of a system which offers a point or points of contact with the apperceived idea, the first result of that contact is the attitude of mind called Attention, the attitude which expresses interest. That attitude gives full opportunity to whatever suggestiveness the apperceived idea possesses; the phenomena described by the psychology of association follow. As a consequence of its union with the apperception-mass which is the dominant system of the moment the new impression gets a meaning, or a fuller meaning than it had before. On the other hand, the system itself undergoes a change, greater or less. At least, it is enriched by the addition of the apperceived idea; more than that, it may be modified or even revolutionised. Everyone has had occasion to note the far-reaching effect in the sphere of his own knowledge exercised by the understanding of one little fact; all have experienced the disturbing effect of a

[1] *Introduction to Comparative Psychology*, p. 352.

great sorrow in the same sphere. A mental revolution in the individual is implied in the phrase 'religious conversion.' An analogous disturbance in the minds of men at large is wrought by such epoch-making ideas as Copernicus's conception of the solar system, Newton's theory of gravitation, and Darwin's hypothesis on the origin of species.

It is essential to the view of intellectual activity here taken that the newcomer, the 'apperceived idea,' must find a place in an 'apperception-mass'—that is, in an existing system—or else fail to be understood or even retained.

FOR FURTHER READING.

Fr. Paulhan, *L'Activité Mentale et les Éléments de l'Esprit* pp. 588. Alcan, Paris, 1889. 10 fr.

Wm. James, *Text-book of Psychology*, pp. xiii + 478. Macmillan, 1904. 7*s.* Especially Chaps. XI., XII., XV., XVI., XXII.

H. Höffding, *Outlines of Psychology*, pp. xi + 365. Macmillan, 1893. 6*s.*

John Adams, *The Herbartian Psychology appliea to Education*, pp. iv + 284. Heath's 'Pedagogical Library.' Especially Chap. III.

K. Lange, *Ueber Apperzeption.* Plauen. (Translated in Heath's 'Pedagogical Library' under title, 'Apperception: a Monograph on Psychology.')

E. L. Thorndike, *The Elements of Psychology*, pp. xix + 551. Macmillan Co., New York. 1905.

SECTION II

THE DEVELOPMENT OF KNOWLEDGE

System.

The most obvious characteristic of any system properly so-called is that it is a well-defined unity, a whole; scarcely less obvious is the characteristic that it is made up of distinguishable parts. An essential, though perhaps less obvious, property of a system is that these distinct parts are all in active association with each other, so that the due discharge of the function of the whole is dependent upon the proper fulfilment of its peculiar office by each of the parts.

The most apposite illustration is afforded by an organism, as political and ecclesiastical teachers have felt when attempting to display their several systems before the minds of men. But the characteristics of unity, diversity and mutual dependence are not peculiar to such organic systems as animals and plants. Every true system shares them; they are found in such an artificial arrangement as a telephonic system as well as in such social organisations as the several grades and types of schools, universities, &c., which, in combination, constitute the educational system of a nation. System means correlation of functions.

Knowledge as System.

It is the nature of intellectual activity to construct systems; in other words, knowledge, the outcome of that activity, is a system, or at least is systematic. Men seek the meaning of the objects and events encountered in the world about them, sometimes to

make use of these in the production of yet other objects or events, sometimes in a more disinterested spirit in order to give an account of the object or the event to themselves or to others. But the search for meaning or explanation, undertaken from whatever motive, quickly reveals the truth that no object of thought can maintain an absolute independence of other objects. 'Like this,' 'unlike that' are reflections which arise spontaneously in the mind that dwells upon the significance of even the most trivial things. Explanation sets forth the *relation* of the single object, fact or event to other objects, facts or events. The more complete the explanation, the greater the number and diversity of the relationships which it establishes between the thing explained and other things. The ideal explanation of any one individual thing would set forth its relations to the universe at large, to the whole system called reality. Explanation so complete and ultimate is unattainable for our finite minds, but we may still believe that there *is* an ultimate explanation; and the ideal helps us to frame or to criticise those partial explanations to which we are driven.

Explanations and descriptions are more or less complete statements of mental systems. But their systematic nature is not always realised by those who hold or propound them. Hegel found three successive stages in the advance of human culture at large as these are embodied in an increasing consciousness of the systematic character of Knowledge. At the rudimentary stage the universe is thought of as an aggregate of individual things virtually independent of each other. The relation of each to all, or even of each to many, is not felt, and change—the outward expression of this relationship—is not always perceived to be causal. What a thing

1. Things.

is, that it normally remains; that it should change excites wonder.

As Plato said, Science begins in wonder. It is the observation of change which leads the mind from the rudimentary stage to the higher.

2. Laws.

Causation is gradually recognised as a universal principle; the relations of things to each other now become explicit. Little by little the universe comes to be thought of not as an aggregate of things, but as a sum of related parts. Changes are perceived to be causal, not casual. Knowledge has then reached the scientific stage—the stage not of Things, but of Law.

But, as Hegel pointed out, Law in its scientific sense is inadequate as an explanation of the universe. We say that we explain an 'effect' by assigning its 'cause.' But when explanation on the grand scale is demanded, these several 'causes' themselves in turn require to be explained; and since a universal or general judgment can only stand as the conclusion of a syllogism when the premises are likewise universals, it becomes clear that the process must go on indefinitely without reaching a final explanation in this sense. Beyond the scientific stage of knowledge as law, Hegel therefore placed the philosophic stage of knowledge as system, in which the universe is conceived neither as a sum of things, nor simply as the domain of law, but as a system, whose changes are due to the system's own inherent activity. The universe is figured as an organism, wherein, however distinguishable by analysis the various parts may be, and whatever degree of partial independence possessed by any of them, all in the last resort hang together. Change in a part means change in other parts, and in the system as a whole.

3. System.

The sequence—thing, law, system—gives the broad

outline of the development of knowledge in the history of individual minds as well as in the history of the race. True knowledge in the individual mind is a system; its parts, or constituents, stand in relationships to each other which are organic. The ideal knowledge is a completely unified system; whatever falls short of system, still more what is not apprehended as related to other things, is to that extent not knowledge in the stricter sense. Ideally, the total operation of the individual intelligence should result in *a* system; in actual fact it leads to systems more or less congruent.

There are other features in the development of knowledge, however, which call for the consideration of the teacher. The progress of knowledge is at once signalised and made possible by the division of the field into portions which maintain a semi-independence; the territory is mapped out into an ever increasing number of partially distinct provinces. Each 'branch' or 'subject' thus originated, while detaching something from one of its fellows, more than compensates for the loss by making feasible a conquest of territory previously unconquered, or even unknown. So recently as Bacon's day, it was not thought too presumptuous for one man to take all knowledge for his province; but, historically, every advance has opened new vistas. Much of a mountain must be climbed before the character of an ascent to the summit is realised.

Differentiation.

The makers of knowledge advance by acting on the maxim, 'Divide and rule.' For a similar purpose, and from considerations of practical convenience, the schoolmaster apportions the matter of his instruction into 'subjects,' 'branches,' and so on. Thus the unity of knowledge comes to be accepted rather as a philosophic postulate than as a matter of concrete experience. The

consciousness of knowledge as a system is greatest in the mind of the philosopher; it varies very greatly in other minds, the nearest approach to the philosophic standpoint being probably that of the child. The latter has not felt the need for division into 'subjects,' and is therefore ready to accept association between different parts of knowledge.

Co-ordination.

His readiness should be utilised. While the exigencies of a time-table must be respected even in the case of the youngest pupils, for them particularly the boundary marks between study and study should not be set up too conspicuously. We do not begin by teaching such a pupil physics, or chemistry, or botany, or any one distinct branch of science, but by calling his attention to the facts of Nature as these are to be noted in his everyday surroundings. Such instruction will, in a sense, be now physical, now chemical, and so on, but will not be at pains to distinguish the one from the other in the child's mind. So with other kinds of knowledge: these young pupils will learn about the scenes of man's activity at the same time that they acquire information about the actions themselves—history and geography will not be studied apart at this stage. Not separate lessons in grammar and composition, but lessons combining several aspects of the mother-tongue, will be the appropriate practice; and drawing will be the accompaniment and auxiliary of studies which, with older pupils, would be thought of as very diverse. The rule is stated by Lange: 'What is related in fact must be related in the consciousness of the child'[1]; of course, so far only as alliance in fact may be noted by the child—a reservation serving to indicate the limits of the principle of co-ordination which we are now considering.

[1] *Apperception*, p. 133.

For all of us, and for children no less, our most active and extensive mental systems are formed under the direction of our practical interests. The professional man tends to survey all knowledge from the professional standpoint, and to organise his stores with primary reference to his own chief occupation. The child has no one standpoint of this all-commanding eminence, but in his degree is impelled to associate what he learns with one or other of his impulses. Were it possible to know all these impulses and to foster or starve them in the case of the individual scholar, the way to an ideal instruction of the individual would be open. To do these things is, of course, not possible; but instruction becomes the more efficient the closer it approaches to the mastery of these conditions of true teaching. Most agree that a class cannot be instructed *en masse*; not so many try to discover and to utilise for the common good the idiosyncrasies of single pupils. Yet it is about these very peculiarities that knowledge tends to cluster in individual minds; and if any further reason were required for discovering them, it lies in the fact that these personal tendencies may be contrary to the true good of the individual, in which case the educator must seek to establish counterbalancing forces.

Practical Interests.

The principle of co-ordination easily passes into the principle of concentration, the leading idea of the latter being the establishment of what is sometimes called a 'core' of instruction—some central study around which and in dependence upon which other studies may be grouped. Some Herbartian writers of to-day use for this purpose 'Robinson Crusoe,' the book which Rousseau would make Émile's introduction to letters. Herbart himself assigned to the 'Odyssey' a prominent part in the education of boys of eight to ten years of age. Nearly

Concentration.

two centuries before Herbart, Ratke proposed to employ the German Bible as a central study.

As these historical examples remind us, it is easier to maintain a true 'core,' a study of common reference for the remaining studies of a school course, when that course is chiefly literary. It is scarcely possible with a very varied curriculum in which are included not only literature and science, but forms of skill like drawing and other manual arts, as well as specialised information like commercial arithmetic, geography, or correspondence. But even in such unpromising circumstances as

Correlation.

these, studies may be profitably associated which at first sight are not usually thought of as having much in common. For example, some boys' schools in which woodwork or metalwork forms part of the studies have found it practicable to co-ordinate such manual teaching with the laboratory instruction in physics and with some of the instruction in mathematics. The boys in the workshop make pieces of apparatus and geometrical models which they subsequently use in the science laboratory, mathematical form-room, or art-room. The correlation has added zest to both occupations. Similarly, many girls' schools maintain a close connection between the teaching of various domestic arts and that of the related branches of science. The use of drawing, also, as an auxiliary to many different branches of study is generally recognised.

In all such cases of co-ordination the bond between one branch and another should lie in the teachers rather than in syllabuses or other machinery—things which have their value only when the persons who are to carry them out feel that they are engaged in a common task which requires true co-operation. It follows that the instructors in the manual arts should be qualified teachers, well able to take the point of

view of the educator, and to bring knowledge as well as goodwill to the common stock.

The Herbartians find in geography, if not a 'core,' at least a meeting-place of different branches of study. Through what may be called its historical aspect it becomes a *trait d'union* between the humanities and the natural and physical sciences. But to discharge this office geography must be taught quite otherwise than it has usually been taught in most schools. Topography of the most superficial kind—that is, the identification of names on a map—has been the leading feature of such teaching; and, until quite recently, the map, if of British origin, was likely to be a very bad one. Learning by heart lists of productions, exports, imports, strings of statistics, completed a very unedifying occupation.

The associations of geography with the natural sciences are but very partially, if at all, made explicit in the schoolroom. For example, too little is made of the effect of the geological history of a region upon its present configuration; it is exceptional to note references to the principles underlying such books as Lord Avebury's on the scenery of the British Isles. The connection between geography and astronomy receives a little more attention in what is called mathematical geography, but it is matter of regret that much of the instruction is no longer given which used to bulk so largely in the prospectuses of old-fashioned 'ladies' schools' under the rubric 'The Use of the Globes.' Physics is more respected than the elder science, since it is hardly possible to omit it in teaching which deals with climate, air, ocean currents and the like.

On the human side, geography passes into sociology, man's habitat being not merely the scene of his activities, but an important factor also in determining their nature. It is this side of geographical instruction which, if developed, might make the study a true core

of concentration; but, great as are its possibilities as an educational instrument, it is unsuitable for school use, except perhaps in good sixth forms.

Probably the correlation of studies has been sufficiently exemplified already, and it is needless to recall the easy associations which may be established between instruction in science and in arithmetic and geometry in junior forms, and between science and mathematics at large, and between history and literature, although outside ancient history and the Greek and Latin writers the latter connection is not always made much of in the classroom.

Co-ordination at length reaches a point at which it must yield to, or, at least, must not hinder the principle of differentiation. Subjects and branches of knowledge must be studied as such, for the reason with which we began; only so can there be advance in knowledge and in co-ordination itself. For, carried too far, the concentration of studies becomes a flagrant abuse. The thing has actually happened in some schemes based upon the close association of history and geography, where the latter study has lost all independence. History cannot be intelligently and fully studied apart from a consideration of the material surroundings of the makers of history. But to include the latter is only to teach history aright; it is in no sense to teach geography.

Differentiation of Studies.

Differentiation of studies is a pedagogical principle corresponding with the mental process of dissociation or analysis;[1] the separation between one branch of knowledge and another will be the more marked the greater the progress of the pupil in knowledge generally. In other words, while the teacher begins with a

[1] See p. 9, above.

psychological order of instruction, he gradually substitutes for that a logical sequence.

FOR FURTHER READING.

C. Lloyd Morgan, *Psychology for Teachers*, pp. xii + 307. Arnold, 1906. Chap. VIII. especially.

J. Welton, *The Logical Bases of Education*, pp. xvi + 288. Macmillan. Chap. I. especially.

Lange, *Apperception*, pp. 132 ff.

W. Rein, *Pädagogik im Grundriss*, pp. 145. Sammlung Goeschen, Leipzig, 1902; especially pp. 95 ff. (translated by C. C. and I. J. van Liew, under title, *Outlines of Pedagogics.* Sonnenschein).

SECTION III

INTEREST

Mental Development.

MENTAL development is the outcome of the reactions between the mind and its environment. Owing to particular combinations of inborn tendency and of special experience, individual minds incline more strongly to the attainment of certain ends and to the performance of the appropriate activities, while they are indifferent to, or even ignore, other ends which, nevertheless, amidst precisely the same surroundings, very powerfully influence minds otherwise constituted.

These particular ends, which possess so great an attraction for the individual, are what is termed his 'practical interests.' The power which these exercise upon the development of a mind is strikingly illustrated in the case of a man who devotes his life to the advancement of some great cause, in whose service his intellect and character are transfigured. But, indeed, a like effect is produced in all creatures, non-human as well as human, by the pre-occupations of their daily life. The beast that hunts by scent or by sight, no less than the man of a given craft, trade, or profession, has his mental growth affected by the pursuit which claims so much of his conscious life. There is a 'dyer's mind' as well as a 'dyer's hand.' Practical interests, therefore, are of high importance for the individual's progress in knowledge.

The term 'interest' is ambiguous. Sometimes it means a subjective state, a condition of mind, in which case the word is often written with a capital letter; but the term may also denote the objects which excite the subjective state, as in one sense of the phrase, 'practical interests,' different from that intended above. Popular usage very frequently identifies the word with 'entertainment,' 'amusement,' regarding the subjective condition as one of feeling only.

Interest: Subjective.

That condition is in truth not so simple, at least three factors being distinguishable on analysis. To begin with, a state of interest includes an intellectual perception that a certain object, or a given set of circumstances, is intimately and peculiarly related to what the percipient believes, or knows, or desires to do. That is, there is a recognition that the 'interesting' object, or circumstance, will in some measure facilitate or hinder some kind or degree of self-realisation. This recognition is accompanied by feeling, it may be pleasurable or painful, with varying degrees of either: when the popular analysis of interest is introduced into educational theory, it is sometimes forgotten that interest may be painful without ceasing to be interest. Thirdly, the intellectual perception and the feeling find expression in the concentration of mind called attention.

When this last topic is under discussion from the point of view of classroom practice, it seems to be expedient to dissociate the term 'interest' from that involuntary attention which is given in response to a sudden or impressive attack by an object on one of the organs of sense. There is reason to fear that mistakes as to the educational import of interest are made, when the strongly personal

Involuntary Attention.

initiative of that state is identified with the mere brute force of an object. For pure psychology the difference may be one of degree only; for pedagogy the difference is rather one of kind.

The foregoing analysis is of Interest as a subjective state. One or two notes may be made on the objective aspect.

Interest: Objective.

There is no absolutely or universally interesting object, since 'interest' is much more a matter of the self interested than of the thing interesting, and 'selves' vary. 'One man's meat is another man's poison.' Similarly, one and the same object is not equally interesting to all men, nor necessarily to the same man at all times.

Direct and Indirect Interest.

Again, objects that are unfamiliar may be indifferent, or even repellent, but as the result of closer acquaintance they may become absorbingly and pleasurably interesting. Knowledge tends to interest as surely as interest leads to greater knowledge. The fact suggests a distinction between forms of interest as intrinsic, or direct, and extrinsic, or indirect. The distinction, though it has small warrant psychologically, is yet useful in its bearing upon practice. An object which appeals to us in itself, and (as is commonly said) for itself, is an object of direct interest, while a thing which, lacking intrinsic charm, yet secures attention because through it some cherished end may be attained, is indirectly interesting. The analysis of interest as a subjective state shows that this division of objects is only arbitrary, because, after all, the one directly interesting matter is some kind of self-realisation. But the division is a convenient one when we have under consideration the practical question, How may pupils be won to co-operate with the instructor?

The teacher would gladly content himself with presenting in his instruction such objects as are interesting in themselves, and a long chain of writers on education may be set out who more than hint that he should confine himself to such objects. Their recommendations are a testimony to the paramount importance to be attached to interest as a factor in learning, and they often constitute a helpful warning against the introduction of matter inappropriate to the knowledge and powers of the pupil. But there is a danger lest mere caprice on the child's part be mistaken for a real interest, in which case the teacher may suffer himself to be guided by the former, while no measures are taken to ensure the presence of the latter.

It needs no argument to show that school conditions do not permit the teacher to rely exclusively on intrinsic interest, though he should utilise it to the utmost. The main directions of this kind of interest in individual children are determined by their mental constitution and past experience, and, so far as these lie outside the instructor's power, must be accepted as *data*. Where the data do not ensure interest in the thing itself, the teacher must rely upon some form of extrinsic interest, such as the scoring of marks, the gaining or the keeping of a 'place' in class, the passing of an examination, and similar devices for the maintenance of a spirit of emulation. Reward and punishment attached to a study are common incentives in the school economy, but it should be as commonly recognised that they are but 'second best' expedients, permissible only as parts of that compromise which every schoolroom represents between the desirable and the actual. They are most effective and least offensive to the aims of education when they are based on the sympathetic intercourse of teacher and taught, so that the incentive is the desire to secure, or the fear to lose, the teacher's esteem.

Of the two, punishment is the inferior stimulus. Hope of reward need not hinder intellectual exertion, whereas fear is always a disturbing element.

Men, boys, and schoolrooms being what they are, resort to an adventitious interest is intelligible; but since all pupils are, or are in the way of becoming, intellectual beings, there is a general condition which, if satisfied, is reasonably certain to be followed by intrinsic interest. The condition is that the subject-matter of instruction and the mode of its presentation in lessons are in accord with the knowledge, capacities, and aspirations of the pupil at his stage of development then attained. To secure that condition is especially the business of method, acting within the scope prescribed for it by the principles which determine the nature and sequence of courses of study. Method and curriculum together accompany and facilitate the development of the child's mind from its immature condition onwards. Instruction so determined and presented enlists on its own side the keen intellectual curiosity which very young children so often exhibit, but which the circumstances of school life too often baffle or extinguish.

Akin to this form of direct interest is the feeling of advancing ability consequent upon increasing knowledge or skill. A child is not usually conscious of this in its general aspect, but the sense of power within a given branch of study is quite within his appreciation. Whereas interest in an object is dependent on the mood of the moment, interest in processes may be continuous. Locke places it at the head of inducements to attention. He says that the teacher 'should make the child comprehend (as much as may be) the usefulness of what he teaches him, and let him see, by what he has learnt, that he can do something which he could not do before.'

On the other hand, the surest of ways to kill intellectual interest is to simplify everything to such a degree that no gaps require bridging, no problems remain unsolved. This appears to be a peculiar temptation of the highly skilled but injudicious teacher, whose very ability tends to make him forget the truism that learning is the work of the learner. The same untoward result follows when children are kept at tasks considerably beneath their powers. When they have outgrown a subject or a lesson the fact cannot safely be ignored. The attempt, sometimes only too successful, to secure a rigid mechanical accuracy through over-familiarity can only end in *stupor pædagogicus*. Here, if anywhere, precision is stupidity. Similarly, an unwise employment of a sound principle causes interest and consequently attention to flag. For example, it is unquestionably true that repetition is necessary to permanence of knowledge. But a monotonous sameness breeds indifference or disgust. If interest is to be kept up, the repetition of what is learned must be in forms as varied as possible.

It was said above that knowledge tends to interest as surely as interest leads to greater knowledge. 'Interest pupils in order that they may acquire knowledge' is a statement of what many consider to be the more significant of these alternatives in relation to the work of the schoolroom. It coincides in part with the opinions of those eminent thinkers like Montaigne, Locke, Rousseau, Froebel, who would adjust instruction both as to its matter and method to the progressive development of the child and youth. 'The child must bring to everything which he does a joyful, laughing interest,' said Rousseau. The statement is by some twisted into caricature, and is for them but the paradoxical notion that to interest means to divert, to amuse, to gild what is, after all, a bitter pill. These

would turn a schoolroom into a circus, and a lesson into a phantasmagoria.

The name of Herbart is nowadays most frequently connected with the topic of interest in its educational aspect; but that view of the matter which appears in the preceding paragraph is not the Herbartian doctrine of interest, though it is not unlike the view with which Herbart began his own practice as a teacher. He has left a fairly complete account of his doings as private tutor during 1797–8 in the periodical reports which he made to the father of his pupils. From these it appears that the boy who is bored by the 'Cyropædia' may be allowed to put it aside for that reason, while his lively interest in chemical experiments is the ground on which chemistry is introduced into the course. Music is neglected because it will prove troublesome to the pupil. Hours of work are chosen which are those when the boys are most disposed to learn; studies are altered in response to the varying display of interest.

Herbartian Doctrine of Interest.

Herbart's short experience as a private tutor was followed by a period of reflection, during which his ideas rapidly matured. In 1806 appeared his 'General Pedagogy,' wherein amongst other matters his doctrine of interest is elaborated till it reaches a commanding position in his educational theory at large. He now lays it down that an instruction to be truly educative must produce in the pupil the sequence: (1) Knowledge; (2) Interest; (3) Volition or conduct. Whereas the usual belief is that the teacher interests his pupil in order to instruct him, Herbart holds that interest is the end, the purpose, of instruction. Knowledge alone is not the goal; it is impossible to put the pupil in possession of all knowledge, or even of that knowledge which may be serviceable to him in his as yet unknown

future. Even general ideas can only be implanted through contact with particular cases, and particulars are always complex, sometimes infinitely so. It is not the acquisition of a body of knowledge which determines the mind's development, so much as that the acquisition itself opens up definite directions (' interests ') along which development may proceed. Hence, Herbart finds the aim of instruction to be the establishment of a many-sided interest in the mind of the learner.[1]

An English schoolmaster of the eighteenth century, a man of much less renown than the German philosopher, had expressed himself to the like effect. This was Vicesimus Knox, master of Tonbridge School from 1778 to 1812, who wrote as follows: ' It must be remembered that one of the most important views in education is to open the mind, and prepare it for the reception of the species and degree of knowledge required in that sphere in which it is destined to exert its activity. It is not the business of the school to complete but to prepare. They who pretend to teach every part of necessary knowledge, and to finish the improvement of the student, during the time that can be spent in a school, are considered by the intelligent among mankind as deceivers and empirics. Those instructors do their duty well who point out the various avenues of learning, and, by leading their pupils a little way into each, enable them to proceed alone in the years of maturity. As many avenues as can well be comprehended, without impeding the progress of the scholar, must be opened for his view, and for his admission.' [2]

Interest expresses itself outwardly as attention, the

[1] The topic is pursued further in the next section.

[2] *Liberal Education*, 3rd edit. 1781.

concentration of mental energy in a definite direction, or upon a particular object, or group of objects.

Attention. The movement of the stream of consciousness is, comparatively speaking, slackened or arrested about the thing or things to which attention is paid. These things, therefore, attain a clearness and an impressiveness which render them suggestive of yet other things belonging to the same or to a similar mental system. The phenomena of association follow.

Except where attention to a given object for a given end has become habitual, there is a marked sense of effort, bodily as well as mental, accompanying an act of attention. Generally, the bodily attitude is that which facilitates the kind of observation required to scrutinise an external object. If the object is a visible one, the eyes are focussed upon it; if audible only, the head is turned in its direction. The head is firmly poised, the muscles are braced, the breathing is controlled. With the growth of habit the state of tension becomes less severe, but is never entirely wanting.

We are apt to think that attention may be continuously accorded for a long interval of time to one object with undiminished vigour. Experiment shows that this is not true. A practised observer (Titchener), speaking of course of the carefully determined conditions reigning in the psychological laboratory and not of the circumstances of the school-room, says that 'the longest stretch of attention recorded is a stretch of twenty-four seconds, and the average length of attention is no more than five or six seconds.' [1] Close attention, as the phrase goes, means continuous attention to a series of related objects of thought, not to a single object. Long-continued attention to a single object

[1] *Primer of Psychology*, p. 89.

ends in unconsciousness, or in the disturbance of consciousness seen in hypnotism. So-called close attention is really rhythmical, rising and falling in its intensity. It is matter of common experience, also, that the number of different objects which can be attended to at the same time is limited. Under laboratory conditions the number does not exceed four or five.

Training Attention.

To attend steadily, and more especially to attend under unfavourable circumstances, is only to be expected in reason from those who have had much practice. Stretches of attention cannot be prolonged in the case of young children. This is to look at the matter from the child's side. There is also the teacher's. For his purpose it is of the first importance that the child shall acquire the *habit* of attending. So long as there is no such habit, every act of attending closely involves an inordinate expenditure of energy. When the habit is formed, a small output suffices for the initial movement, and the process goes on with that economy of force which is the most beneficent characteristic of every habit. Habits arise from voluntary acts. The earliest demands on a child's attention are those which will most influence his future attitude in this respect. The school which permits a listless, half-and-half attention not only fails to form the right habit, but actually inspires a habit fatal to intellectual keenness. The teacher of children, therefore, is bound to furnish adequate motives to attention.

The weak, wavering will of the child and the imperative need for forming the right habit constitute the teacher's problem. The opposing factors point to a solution in short lessons which demand the learner's best. Short, varied lessons, a bright, resourceful teacher, are the best auguries at the outset. Where the teacher can seize upon some useful tendency in the

pupil's mental constitution he has an excellent starting-place from which to train the habit of attending.

Allusion has been made to the bodily strain which accompanies the act of attention ; it suggests a word on the posture of teacher and class during instruction. It is easy to make a very mind-deadening fetish of what is called 'good order.' A French writer, after describing a class seated amidst absolute silence in the uniformity of attitude most approved by the drill-sergeant, closes by saying : 'These children are dead ; bury them forthwith.' An attentive class is very much alive, and life is not compatible with painful 'order' of this kind. As a gathering of individuals, the attentive class will show certain idiosyncrasies in their postures.

On the other hand, children (and teachers) who 'loll' and dispose themselves in attitudes suggestive of the armchair are doing much to make keen attention impossible. Bodily tension and mental concentration go together. A posture appropriate to listlessness and indifference readily induces those conditions of mind. On the contrary, bodily attitude is most helpful in securing attention when it simulates the external tokens of a mind on the alert. The use which the teacher makes of his voice is another factor in the attention accorded by the class. The lulling, soothing influence of the steady monotone maintained by 'the distant fall' and 'the droning bee' are commonplaces of the poet, which should warn the teacher to avoid a muffled tone of voice, maintained at one level without inflection.

What is commonly called 'inattention' in school may belong to one or other of two opposite states. It may be real inattention, a relaxed, listless condition of consciousness, wherein no one thing is attended to in the stricter sense. Fatigue will induce this condition ; but it is probably

Inattention.

rare in the school-room except amongst children of the day-dreaming sort. A so-called 'inattentive' child may be very attentive indeed. He is not attending to the lesson, but he may be attending to a competing external object or internal idea which possesses charm sufficient to drive the lesson into the background of consciousness. Unlike listlessness, this is of frequent occurrence in the class-room. The remedy common to this misdirected attention and many other disturbances of school government is plenty of appropriate occupation for all.

FOR FURTHER READING.

Adams, *Herbartian Psychology*, &c., Chap. X.
James, *Text-book of Psychology*, Chap. XIII.
John Dewey, *The School and the Child*, pp. 128. Edited by J. J. Findlay. Blackie, 1906.

The Herbartian doctrine of Interest may be studied in the following works:

Adams, *Herbartian Psychology*, pp. 277–9.
C. de Garmo, *Herbart and the Herbartians*, pp. ix + 268 ('Great Educators' Series). Heinemann, 1895. 5*s*. Chap. V.
Rein, *Pädagogik im Grundriss*, pp. 81–86 (English translation, pp. 86–92).
L. Gockler, *La Pédagogie de Herbart*, pp. xii + 404. Paris, Hachette, 1905. 10 fr. A most important study, descriptive and critical. 'Interest' is considered on pp. 186–202 and 337–42.

Herbart's own pedagogical writings are collected in a convenient edition, *Joh. Friedr. Herbarts Pädagogische Schriften*, 2 vols., pp. xii + 456 and vi + 466. Langensalza, Beyer & Sons, 1903 and 1896. 8 marks. A biography is included. The editors are F. Bartholomäi and E. von Sallwürk. The topic of 'Interest' is discussed in the *Allgemeine Pädagogik* (vol. i. pp. 162 ff.), in the *Umriss pädagogischer Vorlesungen* (vol. i. pp. 316 ff.). An English translation of the *Allgemeine*

Pädagogik is included in H. M. and E. Felkin's *The Science of Education*, by J. F. Herbart, pp. xii + 268. Sonnenschein 1892. The *Umriss*, written a generation later than the *Allgemeine Pädagogik*, and containing Herbart's matured opinions, is translated by A. F. Lange as *Outlines of Educational Doctrine*, pp. xi + 334. New York, the Macmillan Co., 1904. 5*s*.

SECTION IV

THE SEQUENCE AND 'FORMS' OF INSTRUCTION

The Problems of Method and Curriculum.

THE problems of method and of curriculum spring on the one side from the nature of knowledge, and on the other from that of the childish intelligence. It being granted that knowledge is system, is there a standard form of instruction, a norm, by means of which knowledge may be made systematic in the child's mind, or at least be assisted to assume the organic character more easily and more speedily than without instruction would be the case? The mind in question, though in course of development, is as yet immature. The fact complicates the problem by introducing a psychological element into a discussion which might otherwise be confined within the logical sphere. Yet, though the psychological and the logical do not here coincide, the former works in the direction of the latter; the instructor's business is to hasten the march. Again, of all the great store of knowledge, or of the materials of knowledge, what is especially appropriate to the instruction of immature minds, so that their development may be furthered and an intelligent understanding of their experience attained, so far as that is possible? Amongst the subject-matter thus selected is there any particular order of presentation to be observed for the purpose of more readily attaining these ends?

The schoolmaster's task, or one of his principal tasks, is to establish connections between the un-

developed minds of his pupils and certain 'subjects of instruction.' His procedure will differ as he regards the one or the other as the more essential side of his work. He may think of himself as first and foremost an instructor of immature minds, or he may think of himself as primarily a teacher of a subject or subjects. If he takes the latter view, he will attach most importance in his instruction to the concatenation of the several parts of his subject-matter, trying so to present it to the pupils that they may grasp it as a logically connected whole. On the other hand, the teacher who feels that the chief element in his task is constituted by the immaturity of the pupils' minds will think less of the strictly *logical* arrangement of his material (an arrangement implying a mature mind), and more of ways and means of getting these minds to work in spite of their disability. In practice there will be a wide divergence between the procedures followed by the two instructors, more especially at the outset; but the nature of the developing intelligence tends to bring the psychological procedure nearer and nearer to the other, as instruction proceeds.

The Logical and Psychological Sequences.

Most text-books illustrate the division of a study upon a logical basis. The arrangement secures conciseness, makes reference easy, and appeals forcibly to the trained, well-equipped mind. But these very virtues make the text-book a bad guide to an order of presenting subject-matter to minds which are immature, ill informed, and only partially trained.

For example, the teacher of geography who bases the order of his teaching upon strictly logical considerations will probably follow such a sequence as this—a full consideration of the sum-total of geographical 'definitions,' including ideas remote from his pupil's

experience, the world as a sphere, land-masses and oceans, the continent of Europe, the British Isles, &c. The psychological order would begin with what is familiar to the pupil in his daily life, making from his actual surroundings a course in home geography which would seek to trace geographical ideas and relations, so far as they may be available within those surroundings, in order that the conceptions thus reached at first-hand might become the groundwork of the future study of remote regions. Of course, a mere identification of natural features in the home region as isolated objects corresponding with their definition in the text-book is not following a psychological sequence, nor instructing in home geography. The aim should be to get the pupil to think geographically about the neighbourhood of his school.

Again, the teacher of arithmetic who adopts the text-book order in presenting his subject to schoolboys begins with a study of numeration and notation, taking these, say, to hundreds of thousands. Then simple addition is studied exhaustively, and the three remaining 'rules' are taken in the same uncompromising fashion. Only when the pupil can deal satisfactorily with integers is he permitted to study fractions. The division of 2,001,406 by 985 is an operation precedent to the subtraction of $\frac{1}{2}$ from $\frac{3}{4}$. Similarly, the pupil 'goes through' vulgar fractions before he knows the meaning of $3{\cdot}5$. The alternative order is based upon the pupil's ability to understand a few numbers, and to manipulate these in a great variety of ways. Thus his numeration may only extend to 20, or to 100; but within these limits he adds, multiplies, subtracts, divides at once, so to say. He will early become acquainted with operations employing fractions. Vulgar fractions are involved in simple 'money sums' and in the process of division; decimal fractions come before him as

but another aspect of a scale of notation already familiar to him in the study of integers.

It might be thought that few teachers would adhere so strictly to the order of topics set out in the table of contents of a text-book. Yet, as a fact, thousands have done so in the past, and many still seem to find difficulty in doing otherwise. The recent history of the rudimentary teaching of geometry in England is a familiar illustration. The supposed exigencies of 'the Examination'—that Old Man of the Sea who so often paralyses intelligent teaching—compelled pupils to acquire, or to try to acquire, geometry in the order of Euclid's text: first, all the definitions, postulates, and axioms employed in a given book; then the propositions of that book in due sequence. The result has not been happy; for one Charles Darwin, who found delight in Euclid's logical method, there have been boys in great numbers who have failed to learn geometry.

Analysis and Synthesis.

Whereas the teacher who follows the logical order of instruction works synthetically, the teacher who is guided by psychological considerations works analytically at the outset, thus adapting his method to an intelligence which spontaneously prefers to employ analysis. Taking a piece of experience or matter of fact as it is, he tries to work the pupils' minds into it, without staying long, or at all, over fundamental ideas beyond their comprehension at that immature stage. In the beginning he does not expect from his pupils a clear-cut accuracy of thought or of statement of which they are incapable. Definitions and such-like summaries of knowledge he postpones, until the knowledge is there to be summarised. His course is from the indefinite to the definite, and he is not too impatient on account of the indefinite commencement.

Heuristic Method.

A disposition has appeared during recent years in America and in this country to adopt from Germany and to apply to the teaching of children methods which the Germans themselves confine almost exclusively to the instruction of young men at the universities. The tendency has given us that extreme form of the analytic procedure which is called the 'Heuristic Method,' whose advocates are of opinion that the only true path of instruction is the path of the discoverer or researcher. All teachers who realise that learning is the work of the learner which cannot be performed vicariously, and all students of childhood, are bound to acknowledge the high importance of placing the learner in the position of the discoverer of truth. They must also admit the essential part which analysis ought to play, in early instruction especially. They must therefore give scope for the employment of a heuristic or 'finding-out' mode of learning. But 'Art is long and time is fleeting,' and it would be unwise, if indeed it were possible, to refuse to employ in the instruction of a child knowledge already garnered and ready for his use. The uncompromising advocates of a heuristic method ignore or treat lightly two facts which are of importance as parts of the teacher's problem. The first is the existence of an accumulated store of knowledge, into possession of which the child may enter without retracing all the painful steps of the discoverers. The second is the fact that discoveries are made at the price of much effort, some of which is more or less futile so far as positive results go ; blunders mark the path as well as successes. Now the instructor is there to minimise futility of effort. Accordingly his use of the method of research must be a qualified one. He must make a careful selection of what is to be analysed, and must so guide the analysis itself as to prevent

divergence into blind alleys or by-paths, except in those occasional cases where divergence is permitted for disciplinary reasons.

Logical Method.

Is there no place for the logical sequence in the instruction of boys and girls? Must the psychological order always hold in their case? The conception of knowledge as a system and the synthetic nature of mental process answer the latter question in the negative. Analysis must be succeeded by synthesis. Of the two orders the psychological is for earlier employment and the rudimentary stages, but the teacher's aim should be to abandon it for the other as soon as he safely may.

Infantile methods should not be used for pupils who are no longer infants. Some enthusiasts notwithstanding, it is not lawful to desire 'the extension of the Kindergarten methods upwards to the university.' If this were possible, it could only be accomplished by making of our educational system one great infant school. Spoon-feeding is an admirable practice on occasion; but spoon-fed pupils are very slow to realise that knowledge is system; indeed, they never can realise it by that way alone.

To revert to an illustration above: geometrical instruction which does not pass beyond the accurate use of pencil, ruler, and compass, beyond the folding of paper or cutting of cardboard, fails to teach geometry—nay, more, it obscures the idea of abstract, logical proof. The objection is of general application. Modern teaching is rightly solicitous about the rudimentary stages of knowledge; but the reaction against practices unsuitable for beginners courts the danger of confusing the superstructure with foundations. A psychological order of subject-matter and an analytical method of procedure are the most appropriate modes of instructing the untrained and little-informed, and so furnishing a

basis for later building; but unless the mind is at length brought to appreciate synthesis and the logical organisation of its own content, the superstructure is not raised.

The problems of the fitting sequence of subject-matter and of treatment are customarily summarised in

Maxims.

certain practical maxims, which wear an aspect of platitude that sometimes conceals their easy liability to misunderstanding and misuse. Instruction, it is said, should 'proceed from the particular to the general,' and 'from the simple to the complex.' The first injunction describes the path of induction and analysis, of what was styled above 'the psychological order.' But the 'general' is not the terminus of instruction. The journey thither is only made in order to attain an understanding of the 'particular' otherwise impossible. When the general has been acquired, it still remains to apply it to particular cases, old as well as new.

Of the second maxim, it must be said that 'simple' is not an absolute term standing for the same things in reference to all minds; the word is strictly relative to the actual knowledge, to the mental systems or 'apperception-masses' of the individual. For children and persons of uninformed minds, the particular case is more 'simple' (in the sense of 'more easily known') than the general law or principle which it exemplifies, while for well-instructed persons the general truth is more 'simple' in its comprehensiveness than is the individual, which is always complex. Thus the maxim is double-edged, bidding the teacher proceed analytically or synthetically according to circumstances—that is, in accordance with the powers and knowledge of those whom he is instructing. Strictly, the maxim ought to be taken in its logical sense, when it is the converse of the rule 'Proceed from the individual' (always com-

plex) 'to the general' (the logically 'simple'). Taken psychologically, it is equivalent to 'Proceed from the easy to the more difficult,' though in that form it is hardly worth stating.

In the second chapter of 'Education' Spencer considers at length the rule that instruction should advance 'from the empirical to the rational.' As the general formula of the progress of culture in the race, the maxim may be advantageously employed with respect both to method and curriculum; it is considered below. It is scarcely necessary to add any specific remarks upon the other commonplaces of the text-books, like 'Proceed from the concrete to the abstract, from the known to the unknown.' The general conclusions of the present chapter deal with them by implication. Occasions are many when the teacher rightly begins with the abstract and thence passes to the concrete, as when he expects his pupil to apply in practice some already established law, principle, or rule. 'Known to unknown' has long since passed into the realm of cant and shibboleths.

Herbart's 'Conditions of Versatility.'

The 'Five Formal Steps' of the Herbartian system constitute the best-known and most comprehensive of the various attempts to lay down a 'norm' of instruction. As usually presented to-day, the steps are in great measure the work of later thinkers, but they exist in a well-defined form in Herbart's own analysis of Interest as a subjective condition of mind.

Interest so understood is for Herbart virtually co-extensive with the process by which knowledge in the full sense is acquired. To analyse interest is to analyse mental activity. He discovers in this activity a rhythmical movement which may be likened to the inspiration and expiration of breathing, or to the

alternate contraction and expansion by which the heart maintains the circulation of the blood. First, the mind attends to the concrete objects to be found in the external world which are the materials of knowledge, concentrates itself upon them, and makes them its own, thus enlarging its content. Secondly, the mind, disturbed by the entrance of the newcomers, seeks to restore its own unity by placing these within appropriate systems or 'apperception-masses.' What was an external, independent object now suffers assimilation into the mind-content. The rhythmical pulses of the whole movement Herbart termed respectively Concentration and Reflection; and each of these upon further scrutiny presented two aspects.

The first consequence of concentration is that the object attended to attains definition, precision, clearness; the condition favours its association in consciousness with whatever may there be related to it. Thereupon, reflection begins and the newly acquired information is assigned to its proper synthesis, is ranked under an appropriate general proposition. Finally, knowledge so elaborated is ready to be put to use. Application to practice is the best test and true function of knowledge. These four steps in the process were respectively named by Herbart Clearness, Association, System, Method.

'For the beginning, so long as clearness concerning what is individual is the chief business, the shortest and most easily understood words [of the teacher] are appropriate, and it will often be advisable to have these repeated exactly, after they have been spoken, by some if not all of the scholars. . . . For association, free conversation is the best way, because by it the pupil gets the opportunity of testing, altering, and multiplying the casual associations of his thoughts in the manner which happens to be easiest and most suitable for him-

self, and of appropriating in his own way what he has learned. Thereby he will avoid the rigidity which arises from a learning exclusively systematic. On the other hand, system demands a more connected exposition, and the occasion of it must be definitely separated from that of the repetition [occurring in the first stage]. By making principles conspicuous, system renders appreciable the excellence of co-ordinated knowledge, and the sum of knowledge is increased through greater completeness. The pupils know not how to value these two advantages, if systematic exposition comes too early. The pupil will obtain practice in methodic thinking through tasks, through his own employments, and through their amendment. For in these it will be evident whether he has rightly grasped principles, whether he is in a position to discern them amidst what is of secondary importance, and forthwith to apply them.' [1]

The Method-Unit.

Subsequent thinkers have worked out the implications of these four steps with some elaboration. Their number is now commonly stated as five, and it has been found necessary to use a special term ('method-unit,' 'method-whole') to denote the scope of the procedure included in the steps.

Just as the field of knowledge is mapped out into separate and partially independent territories, the various 'subjects' of the school course, so there are subdivisions of a like standing within these subjects themselves. The 'method-whole' may be loosely regarded either as one of these subdivisions, or as so much of the subject-matter as is sufficiently associated to be treated in a series of lessons, few or many, and quite exceptionally in one lesson. Strictly interpreted, a

[1] Herbart, *Umriss pädagogischer Vorlesungen*, sec. 69.

method-whole is so much of the subject-matter of a branch of knowledge as may be grouped under a general proposition. But whether understood broadly or narrowly, 'method-wholes' vary in comprehensiveness. The rule for the division of fractions and the influence of habitat upon human history are both theses which the teacher may be required to maintain, and both are method-wholes. Further, the formal steps are the gradations, not necessarily of a single lesson, but of a method-whole.

'The Five Formal Steps.'

In English text-books the steps commonly bear the following names, taking them *seriatim* : (1) Preparation (of the pupil's mind); (2) Presentation (of new matter of knowledge); (3) Association (of the new with the old); (4) Generalisation (of the foregoing); (5) Application (of this generalisation to practice). There is an advantage in using the following as respectively alternative : Analysis, synthesis, association, system, practice. It will be observed that the first two steps are evolved from Herbart's first step—Clearness.

The tradition still survives in some quarters that an oral lesson should open with an 'introduction,' so called, wherein the teacher seeks to 'elicit' from the class by means of oblique questions and hints the word or words forming the title of the lesson. The practice wastes time, commonly leads to the snubbing of some pupils, and almost invariably encourages guessing, bewilderment, and irritation, according to the temperaments of the pupils, few of whom have their thoughts directed into the desired channel. The Herbartian 'Preparation,' on the other hand, begins with a brief, direct statement from the teacher of the particular aim proposed for the method-whole of which the lesson is a part. The terms of the statement do not anticipate the general proposition to be established in the fourth

step, since the pupils are not supposed to understand that generalisation at this stage; but the words are sufficiently precise to direct the flow of thought or to concentrate it. Under these conditions Association gets its opportunity in the minds of the class.

The teacher then proceeds to gather from the class whatever knowledge immediately relevant to his topic is in the pupil's possession. Some appropriate mental system or systems must be awakened if the information which he is about to impart is to be apperceived. The mode of doing this varies according to circumstances. Sometimes it takes the form of answers to the teacher's questions, at others it is done by way of recapitulatory statements at length which particular members of the class are required to give. In all cases the work is thrown upon the pupils, but without the occasions of stumbling created by the so-called 'introduction' mentioned above. When Preparation is successful, expectation is aroused, and the pupil is ready to apply himself intelligently to fresh matter.

Presentation follows, the teacher now assuming a more active part in the lesson. The information which he desires to communicate is presented by way of the ordinary devices of direct statement, illustration, exemplification, questioning both by pupils and teacher, the procedure being determined, as to its specific character and copiousness, not only by the generalisation towards which the class is moving, but also by the nature and fulness of the knowledge which the Preparation proved that the pupils possessed.

The third step, Association, exists as a thing apart less as matter of fact than as an element discoverable by a logical analysis. It consists in the conscious association by the pupil of that which he brought to the lesson with that which the teacher has just presented to the class. The nature of consciousness being what

it is, that association does, in fact, proceed in the pupils' minds if they are really engaged with the lesson while the teacher is busy with the second step. Suggestion may be necessary to the slower wits, and in some lessons the teacher may find explicit comparison between new and old indispensable. To that extent there is a third and independent step. But it is usually not easy to disentangle Steps II. and III. in actual teaching.

The fourth step throws into a general proposition the concrete material of the earlier steps, thus binding it into a system. It is upon the concrete base of fact dealt with in the previous analysis, synthesis, and association that the abstract fourth step is erected inductively. The proposition itself may be a definition, a mere rule, or a comprehensive law or truth; its terms are provisionally formulated by the pupils, and then made exact by the teacher. Oral lessons only exceptionally reach the completed fourth step of a method-whole; but it is advisable to close every such lesson with a brief recapitulation by means of questions or a summary written upon the blackboard.

Generalising.

The procedure followed in these four steps may be regarded as the inductive establishment of a general proposition; it therefore exercises pupils in the construction of logical proof, and helps them to appreciate its nature. Generalising is so spontaneous as to wear almost the aspect of an instinct. Very young children exhibit the faculty, old and disciplined reasoners do not always escape its attendant fallacies. Instruction, therefore, is bound both to give it exercise and to make the pupil aware of its dangers.

When a study, or the manner of presenting a study, is condemned as not educative, the meaning usually is that the tendency to generalise is obstructed, either

through absence of scope or through the alternate suggestion of the truth and falsity of the same general proposition. Learning to read a language written in an anomalous spelling is a case in point. On the other hand, it is especially incumbent upon the teacher of young children that he should not set an example of hasty, ill-founded generalisation, whether in morals, in history, or in natural science. It is commonly recognised that in teaching the last the school sometimes flagrantly sins in this matter ; but the generalisations of the school-room in history and morals probably do much greater harm, since they are not open to such prompt correction as awaits the 'scientific' blunder.

The point which is emphasised by the procedure of the steps is that learning is the work of the *learner*. A system is rounded off in a generalisation, or other formula, for him only who has constructed the system in his own mind by the absorption and assimilation of the relevant concrete matter. The essential thing about 'cramming' is, that its strength depends on the formula alone, which thus represents a pseudo-system, one of those 'concepts without percepts' which Kant said were 'empty.' The form is in the pupil's mouth or memory, but the matter has not been apperceived, is not part of the mental texture, and the formula is therefore short-lived.

The formula which is a formula only betrays itself when the attempt is made to apply it deductively. The

Practice.

fifth step, the application of step four to practice, is an obvious test of the validity of the pupil's profession of knowledge. But, if action be the fore-ordained goal of thought, it is also the natural and inevitable sequel of the generalisation reached in the preceding stage. Repetition in any case is an indispensable factor of instruction, and a repetition free from tedium is possible when it takes the form of

varied exercises in the practical application of rules, principles, laws. The great majority of school lessons concerned with the acquisition of knowledge are instances of the fifth step; for example, the working of 'sums,' solution of problems, grammatical exercises, the writing of 'compositions.'

The Five Formal Steps, being, on the whole, a logical analysis rather than a psychological description, furnish only general indications for the arrangement of a course of lessons whose purpose is the attainment of knowledge; the guidance which they furnish as to the actual procedure to be adopted in single lessons having that purpose is small, and yet easily overrated. Further, they do not state the norm or canon of every kind of instruction which the school is expected to give. They belong to the sphere of knowledge; skill, feeling, even conduct in a great measure are outside their province.

'The Steps' not a Universal Norm.

Skill rather than knowledge is the aim of lessons in drawing, writing, and in manual work generally, in physical exercises and deportment. Even reading in its very earliest stage, the recognition of signs for sounds, is largely a matter of skill, and the correct spelling of a very large number of English words depends much more upon a practised eye than upon any operation more definitely intellectual.

Instruction intended to cultivate skill must look for guidance to the psychology of Habit. On the physical side the great fact about habit is that it involves a special adjustment of the nervous and muscular systems, which makes the body an efficient machine for the performance of the habitual action. With this capacity is coupled a desire—in some cases a very insistent desire —to perform the action whenever the appropriate condi-

Habit and Skill.

tions are present. The familiar phrase 'the force of habit' might well run 'the imperiousness of habit.' To thwart a confirmed habit is to inflict the distress which follows the frustration of a natural instinct; where habit has become pathological, the sufferer will commit abominations to satisfy his craving. The adaptation of the physical organism to the act is made possible by the plasticity of nerve-substance and the control which the nervous system exercises over the muscular. Currents are easily set going within the former system, and the repetition of a current forms a path, or line of least resistance, between one centre of nervous energy and another, and between centres and muscles.

The nerve-centres situated upon the outward surface of the brain are the higher centres, those deep within the brain-substance, at the base of the brain and in the spinal cord, are the lower; the terms 'higher' and 'lower' are related to the measure of control exercised by the centres. Consciousness is the invariable accompaniment of the functioning of the higher centres. The lower centres may, and very frequently do, discharge their office by giving rise to actions without involving consciousness at all. Comparing animals low in the scale of organisation with those that are high, it is found that the entire nervous system of the former is in some cases devoted to the superintendence of activities which in the higher type are controlled by a portion only of the whole system; that is, as creatures rise in the scale, there is an increasing delegation of functions to the lower centres, while the higher centres are left free for activities which are the more complex the more highly organised the animal itself. The delegation promotes efficiency, rapidity, and accuracy of action, with economy of effort.

While the higher centres exercise control deliberately,

that of the lower centres takes effect automatically. When a person is trying to acquire some form of dexterity—to wield a pen or a brush, to manage a rifle or a bicycle—every movement is for him a matter of active, even anxious, attention, so that he has no thought for anything else; yet the consequent movements are neither graceful nor effective. Contrariwise, the skilled performer, quite unconscious of the great majority of his movements, makes these with a rapidity, precision, and gracefulness never attained in the time of his novitiate. Habit signifies the delegation of control from the higher to the lower centres.

Instruction Aiming at Skill.

This transfer of control is the immediate object of instruction which aims at producing skill. The 'form' of such instruction is logically analysable into imitation and practice under criticism. These, however, are not 'steps,' for, although direct imitation at first precedes more or less independent practice, the instructor must resort now to one, now to another, his choice being ruled by the special adaptability of his pupil. Moreover, it is a nice question for the teacher as to the frequency with which he will make imitation his auxiliary, and what degree of conformity to pattern he shall require. There must be differences in these respects in the employment of imitation in dumb-bell exercises and in lessons on the art of reading aloud.

Taste and Feeling.

The last illustration suggests yet another consideration appropriate to a discussion on 'forms' of instruction. Reading aloud is an exercise which displays not only skill and understanding, but Taste also, and the two 'forms' (of Knowledge and of Skill) thus far considered are only very imperfectly helpful to the purely æsthetic aims of instruction. Again, there are no school lessons of greater educational importance than

those which aim directly at affecting conduct. Moral activity is partly a thing of knowledge, partly a thing of habit; but it also signifies a mode of feeling. A psychology like Herbart's, which denies the fundamental nature of feeling, need be at no pains to construct a norm of æsthetic instruction; it is otherwise where feeling is regarded as a primitive element of consciousness.

'We require to be trained from our earliest youth,' as Plato says, 'to feel pleasure and pain at the right things. True education is just that.' What is the form of instruction whose purpose is the cultivation of feeling and of taste? An adequate answer to this question could only be reached, if at all, after an investigation of the whole field of Æsthetic, and for such a survey the present writer is incompetent. There appear to be divergences of opinion amongst professed students of the science, and it seems possible still to say with Herbart, that 'the theory of taste lies in too much obscurity to permit anyone to undertake an exposition of the elements of the different species of æsthetic and of the synthesis of them.'

Instruction Aiming at Taste and Feeling.

If a merely empirical reply will suffice, then Plato in the 'Republic' has answered the question as far as it affects the instruction of young children. His directions may be summarised in the injunctions: Provide opportunity for the excitement of feeling about that which is beautiful and morally good; shut out from the child whatever it is desired should become distasteful to him. In other words, influence his emotional nature by means of suggestion. Thus the child is to be trained to the recognition of, and love for, that which is beautiful and good in painting, music, literature, and conduct by the steady, habitual contemplation of examples of their

several excellences. These will grow into his soul, there unconsciously to erect standards of goodness and beauty, to cultivate a healthy taste which will make their opposites repellent to him.

It is clear, however, that suggestion is not sufficient to constitute a norm of instruction, or how are we to explain the insensibility of some minds to the beauty which lies about them? Feeling cannot for ever be satisfactorily fostered apart from knowledge. If there be any standards of taste which are valid for more than one person, an analysis of their conditions and some general statement of their nature seems feasible. Thus in time the merely receptive attitude of the learner is changed for an analytic and critical one. It is not enough that he feels this poem, this picture, this musical passage to be beautiful or ugly; he desires to give reasons why they are so. Intelligence is sharpened and feeling is made to flow more freely by the *successful* imitation of a work of art. On that ground practical execution is rightly said to play a part in forming taste. But the part is not universal, since admiration for a picture or poem is quite compatible with entire inability to paint or to write verse. Admiration for mere technique is indeed not æsthetic at all; but the attempt at performance certainly helps some minds to the intellectual analysis here in question.

In applying the 'form' of knowledge within the field of the æsthetic, the instructor runs the risk of setting up cant or priggishness where he seeks to install an enlightened understanding. The danger is inherent, since taste is so much a matter of temperament and individuality. But the topic is better considered in association with the concrete material to be found in a specific branch of the curriculum, and it is returned to in Part II. Section II.

Imitation, which of course involves suggestion, and

practice under criticism are also 'forms' of the instruction which seeks to direct conduct; indeed, some writers, notably Aristotle and Locke, would confine early moral training to the formation of habits. Long before conscious moralising begins, the child shows the instinct of imitating the behaviour of those about him. Example which induces mere imitation of the concrete act has its value as part of the system of government holding sway in the home or the school; but for the discipline of character much more than imitation and the suggestion of emotion are necessary. Moral principles must be developed, and this is an affair of the intelligence as truly as are the principles of geometry or the truths of physics. Moral training is more than a cultivation of the intellect; but it is that. Familiarity with the great souls of history and of literature may constitute a moral atmosphere making life therein fuller and deeper, even though great moral truths be only dimly apprehended as such. But the familiarity will be more life-giving where the ethical law is consciously held and observed. In the bare, concrete imitation of examples, there is but little opportunity for the exercise of judgment or the comprehension of principle. Suggestion and imitation do not alone suffice as the 'forms' of the instruction which is here in question. To them must be added a more active and conscious exercise of intellect, since it is one of the functions of moral instruction to erect practical maxims for conduct, just as it is a function of æsthetic instruction to lead the pupil to formulate standards of taste.

Conduct and Instruction.

Still, it remains true that the earliest instruction in morality must deal largely with concrete instances, with examples of principles in themselves abstract, though morality itself cannot be based inductively upon these instances. The logical prior must, as elsewhere

in early instruction, give place to the psychological. And at all stages and for all pupils, save the philosophic few, the individual 'example' comes with an emotion-stirring power rarely possessed by an abstract principle.

FOR FURTHER READING.

H. Spencer, *Education, Intellectual, Moral and Physical*, Chap. II.

T. Raymont, *The Principles of Education*, pp. viii + 381. Longmans, 1904. Chaps. VI.–X.

On the Heuristic Method : *Special Reports on Educational Subjects*, vol. ii. (Cd. 8943), No. 19 ; *The Heuristic Method of Teaching*, by Professor H. Armstrong, sold separately, price 3*d.* Eyre & Spottiswoode.

On the Formal Steps : Herbart's *Allgemeine Pädagogik*, Book II., Chap. II. ; *Umriss*, Part II., Sect. II., Chap. III.

Rein, *Pädagogik*, pp. 111 ff.

The later development of the doctrine of the 'Steps' is criticised by :

O. Messmer, *Kritik der Lehre von der Unterrichtsmethode.* See Section VIII. below.

J. Welton, *Principles and Methods of Teaching*, pp. vii + 566. University Tutorial Press, 1906. See pp. 69 ff.

On Habit : James, *Text-book of Psychology*, Chap. X.

On Moral Instruction : J. MacCunn, *The Making of Character* pp. vii + 226. Cambridge University Press, 1900.

SECTION V

LANGUAGE AS VEHICLE OF INSTRUCTION

LANGUAGE being the chief means of intercourse between instructor and instructed, a few words may be fittingly given to considering it from that point of view.

Language and Mental Development.

The lack of this particular vehicle of communication, or at least the difficulty of securing it, places an obstacle in the way of the instruction of deaf-mutes which in many cases proves insuperable. Generalities, relations, and abstractions come readily in due course to the apprehension of children who speak and hear others use words; but it is hard to bring the deaf-mute to the conceptual level. Language facilitates the progress of thought and the development of intelligence; the association of subtility in language and in thought is a commonplace. A tongue rich in general terms, in nice distinctions, and in range of vocabulary makes easy the acquisition, by those who speak it, of the ideas of which these words are the tokens. In learning to speak his vernacular, a child appropriates much of the knowledge, philosophy, religion, morality, and modes of thought which are latent in the language and are characteristic of those who speak it. The child's progress in the mastery of these essentials of the national life, as well as the progressive unfolding of his own mental powers, must be conditioned in great part by his advance in command over the national language.

Thus the individual profits from the experience of his race, making that experience through language supplement his own. But there is a price to pay. Accepting judgments ready made must sometimes mean taking over prejudices, and in all cases there is a certain discouragement of the free play of the individual intelligence. That 'the disciple ought to believe' is true in varying measures at all stages of instruction, since it is implied in the relation of instructed to instructor. How to choose our authorities is one of the things which education should teach us. Yet deference to authority is not one of the leading characteristics of an age of inquiry; and inquiry has made good its right of entry into the schools.

Authority.

The question is one which depends upon the view taken of the purpose of education as a whole; it also arises outside the province of instruction when the limits of the educator as governor come to be considered in relation to the free initiative of the educated. Of the two extremes, 'all inquiry, no authority,' and 'all authority, no inquiry,' neither is entirely practicable nor healthy in the school-room, where perhaps the second more readily finds a foothold.

Language is no assortment of verbal labels made after the pattern 'One thing, one word'; it is a system of *general* signs in which one word may stand for an infinite number of objects, and of all such general systems it is the best. In ceasing to be general in character, language would cease to be itself; yet generality opens the door to equivocation. A teacher who does not know the limits or peculiarities of his pupils' vocabulary may unconsciously betray them into that common kind of fallacy. Thus, a girl catches the phrase 'the falls of Schaffhausen,' remembering that the word 'fall' is sometimes used as a synonym for 'veil,' but forgetting 'water-

Equivocation.

fall.' On a later day she mystifies an examiner by asserting that Schaffhausen is famous for making veils.

Between the mental image or idea in the mind of the teacher, his spoken word which is its symbol, and the image or idea evoked in the mind of the pupil, there is opportunity for misunderstanding. So long as a term means much the same thing for teacher and taught, instruction may proceed. The danger lies in assuming as matter of course that words invariably mean the same for both. If they did, those mortifying misunderstandings called 'howlers' would be of less frequent occurrence. General terms should be the equivalents of ideas clearly and distinctly comprehended. Where the teacher, by his own use of words, takes for granted that the pupils have this comprehension without troubling to discover if it is so, or where he permits the habitual use by his pupils of terms very imperfectly understood, or not understood at all, he and they will be always playing at cross-purposes, to the hindrance of instruction. Again, the teacher of young children must be alive to the fact that they are especially quick at picking up sounds as such. If he doubts the fact, let him compete with them in learning a long rhyme in 'nonsense syllables.' A child will imitate and retain words and groups of words which are either meaningless to him, or with which he has set up some bizarre association foreign to the word as generally understood. Here lies the danger of unintelligent 'learning by heart' from the teacher's lips; it is the explanation of the little girl's statement that the nose is supplied with 'awful factory nerves.'

Much of the work of the teacher of junior pupils must perforce consist in conveying to them the import

Meaning.

of general terms, and in securing the appropriate employment of words. Without trespassing unduly upon the sphere of the

logical text-book, it may here be recalled that, to be appropriately used, words must represent ideas which are clear and distinct in the speaker's mind. Clear, because any one idea is sharply distinguished from ideas which are similar; distinct, since its component parts are severally apprehended. The logical processes of division and definition may be made helpful in conferring clearness and distinctness upon ideas.

Form and Matter.

But these processes may all too easily contribute to a scholastic barrenness. The history of education testifies that the tendency of schools is to value form above matter, to aim at a premature command of the general before a sufficient hold has been got over those particulars which the general summarises. Convinced with Kant that 'percepts without concepts are blind,' they sometimes forget that 'concepts without percepts are empty.' In the haste to secure the advantages for practice which belong to the universal and abstract, the attempt is sometimes made to begin with these.

Definition and Division.

Definition consisting in the statement of the meaning of a term—that is, the setting forth of the attributes essential to the notion defined—it follows that it has significance only for those who are already acquainted with those attributes. Definitions, therefore, are more usually in place at the conclusion than at the beginning of a lesson or other complete piece of instruction. 'The writers on Logic in the Middle Ages made Definition the last stage in the progress of knowledge; and in this arrangement at least the history of science and the philosophy derived from the history confirm their speculative views.' [1]

The process has two different parts to play in in-

[1] Whewell, quoted in Mill's *Logic*, iv. 4.

struction. When the object in view is an addition to the pupil's knowledge other than the knowledge of words, instruction works up to the definition as to a summary, the definition itself standing as a form whose matter consists in all those concrete details by which the teacher tries to make it significant. When the purpose is an exercise in the correct use of words, the pupil may at the outset be required to define his terms —that is, to state explicitly the several parts of their meaning, thus ensuring distinctness of idea. Similarly, the logical division of a term assists in making the corresponding notion clear to the user's understanding.

The fallacious use of these two logical processes is probably nowhere better exemplified than in the teaching of English grammar. The cardinal fault of a bad division is cross-division, consequent upon neglect of the rule that in dividing a term one and the same standard of reference only should be used throughout. Yet the division of nouns into 'common, proper (that is, not common), *and abstract*' is traditional. Defining in a circle stands self-condemned, even when it is partly concealed by the use of a synonym. 'A noun is a name of a person, place, or thing.' If a child's notion of 'name' is correct, the substitution of the term noun, however necessary, does not add to that notion, but merely gives an alternative expression. The pretended definition gives no information as to what the notion is to which 'name' and 'noun' both apply. Synonyms, of course, must be used if pupils are to enlarge their vocabulary and capacity to understand others ; but giving a synonym is not defining.

FOR FURTHER READING.

Edward Thring, *Theory and Practice of Teaching*, pp. xiv + 264. Cambridge University Press, 1889. Part II., Chaps. IV., VII.–XI.

J. Adams, *Primer on Teaching*, pp. 129. Edinburgh, T. & T Clark, 1903. Chap. V.

Welton, *Logical Bases of Education*, Chap. III.

SECTION VI

THE ESTABLISHED CURRICULUM

INSTRUCTION is an intermediary between the mind of the child on the one side and knowledge on the other.

Curriculum.

The intelligence of the child though immature is rational in tendency, if not always in actual fact, and its normal operation therefore tends to group in systematic fashion the material which is offered to it. Knowledge ideally conceived and in its entirety is a unity. The knowledge which falls short of this excellence is the less imperfect the more organic it becomes. From this point of view instruction aims at assisting the pupil to learn in such a manner that his acquirements form an ordered system, or systems, over which he has control both for recall and for application amidst varying circumstances. Seeing that the mind under instruction is in course of development, and that instruction may be prolonged through a not inconsiderable period of time, these systems will differ at different moments of the process, both in respect of actual content and in complexity of organisation.

The division of knowledge into branches of learning, or 'subjects,' more or less separate, is indispensable for the advancement of knowledge itself and for the communication of what is already known. From amidst the multitude and variety of these 'subjects,' what precise selection should be made for the construction of

systems appropriate to the needs and the capacities of the growing intelligence ?

The reply, expressed even in merely general terms, must depend upon whatever conception is entertained of the purpose of education as a whole. It is outside the province of this book to consider that conception at length; but it is assumed that education is a preparation of the individual for the life he is to lead when school-days are over, that the formation of character stands first amongst the particular aims of the process, that there are other aims subordinate to the formation of character, yet of sufficient intrinsic value to deserve formulation, and that some at least of these may be expressed in terms of knowledge or ability—that is, as 'subjects.' The usual method of discussing the problem of the curriculum is to consider the nature of the educational end in general, and thence to deduce the courses of study which promise to assist the educator in achieving that end. This undoubtedly is a road to be followed in a purely scientific consideration of educational theory, and some attention will be accorded to it in the course of the present section. But it is not the only way open, more especially for the purposes of a manual dealing rather with what is best in current practice than with abstract principles or fundamental reforms.

Study of a Particular Curriculum.

After all, curricula are established institutions, and, speaking generally, their establishment is of long standing. It is therefore possible to reverse the route, making a study of some particular curriculum actually in operation with the view of discovering such general principles as underlie it. Once brought to light, such principles may be referred to the general aim or aims of education.

The fruitfulness of such a study will obviously

depend upon the choice of the particular curriculum for consideration. Other things being equal, that will be best for the purpose which purports to be based upon intelligible principles, which has had a long history, and has had to encounter criticism and has undergone consequent modification.

The courses of instruction now in force in the secondary schools of Prussia meet these requirements. These express clearly conceived principles which are in turn directed by a well-determined idea of what constitutes the 'educated person.' The Prussian secondary curriculum has a fairly long history as a thing deliberately planned and supervised by the State—at any rate, a longer history as a State institution than any other existing course of European instruction can show. Further, this history, extending from the national movement which followed the disastrous conflict at Jena in 1806, and coming down to the present day, is really a history, inasmuch as it speaks not of mere continuance, but of growth. During the reign of William II. the curriculum has been the object of very close scrutiny, two important crises of its development occurring in 1892 and 1901 respectively. As the courses now stand, they represent ideas a century old, ideas of to-day, and something of a fusion of both, without being a mere patchwork; nor is the growth completed.

German and English School Courses.

Contrariwise, official regulation of secondary schools by the English State is as yet barely begun, and the curriculum so far laid down does not pretend to cover all secondary schools, nor even the whole school-life of a pupil in such schools as are affected by that curriculum. Lack of simplicity in arrangement and in working has been a very general mark of English secondary school courses in the past, as it is to this day in schools not receiving money grants from the

State. Although this characteristic is not necessarily a token of defect, it makes these courses too complicated to form the basis of the kind of inquiry here in view.

A significant difference between our own and most Continental practice may be cited in illustration. It is a mere truism to remark that as length of school-life differs from pupil to pupil, one and the same course is not feasible for all alike; and, further, where the school-life is of the same duration, differences of intellectual aim compel differences of curriculum. But English secondary schools, as a whole, were slower than the Prussian State in admitting the need for a course of instruction completed at so early an age as sixteen; and, to this hour, almost every English secondary school, of whatever grade, endeavours to meet great diversities of intellectual aim in its pupils. Thus it has, perhaps, a classical 'side,' a modern or a commercial side, a science side, sometimes with almost endless possibilities of passage between two or more sides. The consequent complexity of organisation and of curricula tends to conceal general principles, or to encourage the belief that there are no principles and only one injunction—*Fay ce que vouldras.* The simpler Prussian organisation with its separation of what we call 'sides' into distinct secondary schools, its refusal to contemplate passage from one to another as anything but abnormal, and the paucity of optional or 'extra' subjects, make it more suitable for the immediate purpose.

The simpler organisation reflects a more settled frame of mind in the organisers. But it should be noted that the changes which have taken place during the history of these German courses have not tended to simplicity, and change is likely to continue. Further reference to this point is made below.

Prussian Secondary Schools.

The Prussian classification of schools is well known. Of the four kinds of secondary schools, three—namely, the Gymnasium, Realgymnasium and the Oberrealschule—have a nine years' course, and the fourth, the Realschule, has a six years' course. Acting on the knowledge that German secondary schools suffer a considerable exodus of boys about the age of sixteen, all such schools now so arrange their programmes that the first six years of school life afford an instruction which is comparatively complete, though there is no break between it and the work of the succeeding three years in a nine years' course.

The courses are designated by the letters A, B, C, D, following the order of schools enumerated above. Since Michaelmas 1901 the classes of D have been coincident with the six lowest classes of C, and an alternative course, D^1, is in existence. In all schools the lowest class is the sixth (Sexta), the boys entering at about nine or ten years of age. The course is arranged on the assumption that most boys will complete the studies of a class in one year, but arrangements are made for the benefit of the not inconsiderable number who fail to do so. The highest class is the first (Prima). In a nine-year school Prima, Sekunda, and Tertia each forms two classes, upper and lower, thus with Quarta, Quinta, and Sexta completing the set of nine forms.

The official *Lehrpläne* set out the number of hours devoted weekly by each class to each of the subjects included in the curriculum. It is therefore possible to use these numbers as a gauge of the importance attached to the several studies. Determined in this way, the leading 'subjects' of the several kinds of school are as follows. The figures denote the proportion of school-time (expressed as a percentage) which is given by all

the classes taken together that follow the study particularised :—

(A) *Gymnasium.*—Latin, 24; Greek, $12\frac{1}{2}$; mathematics, 12. No other study reaches 10 per cent.

(B) *Realgymnasium.*—Latin, 17; mathematics, $14\frac{1}{2}$; No other reaches 10 per cent.

(C) *Oberrealschule.*—French (or English) and mathematics, $16\frac{1}{4}$ each; natural science, $12\frac{1}{2}$; German, $11\frac{3}{4}$.

(D) *Realschule.*—French (or English), $18\frac{1}{2}$; mathematics, 17. No other reaches 12 per cent.

In all four types of curriculum the study of language stands first, and mathematics is a leading subject in all. The languages may be ancient or modern. If the former, Latin has first place.

'Subjects' Common to All.

The tables given below set forth the subjects which are common to all grades of secondary schools in Prussia, with the number of hours spent upon each during the week, taking as before one class with another. The maximum number of hours includes physical training (three hours weekly in every class), but not singing, as the time given to the latter above Quinta is indeterminate. Ever since Süvern in 1812 made 'bodily exercise' an occupation for the half-holidays, physical training has been regarded as recreation of a sort; but as it usually occupies nearly 10 per cent. of the school-time, and is generally considered to be one of the most fatiguing of German school exercises, it is included here amongst subjects of instruction.

Studies Common to all Secondary Schools, with Number of Hours spent Weekly in Each by all Classes together.

—	A	B	C	D
Total weekly school-hours	286	289	289	189
Mathematics	34	42	47	32
Mother-tongue	26	28	34	22
History and Geography	26	28	32	20
Gymnastics and Drill	27	27	27	18
Natural Science	18	29	36	18
Religion	19	19	19	13

The above are taught in all four grades of school from the lowest class (Sexta) to the highest (Oberprima). To them must be added as studies common to all secondary schools: (i) A modern foreign language taught throughout the school in C and D, but begun in Quarta in A and B; (ii) drawing, begun in Quinta in all schools and continued up to the highest class, except in A, where it stops at the upper Tertia class, though it may be continued optionally to the top of the school. Thus the above table should be supplemented as follows, the figures as before standing for the number of hours given to the subject.

—	A	B	C	D
French (or English)	20	29	47	35
Drawing	8	16	16	10

These common studies are the necessary constituents of a secondary school curriculum as understood in Prussia. They and the leading studies already named, which differentiate one type of secondary school course from another, will be found to fall into one or other of the following groups.

(α) A group of linguistic and literary studies, of which the vernacular is always one, but never the only one. This, the humanist group, as it may be called, also includes religion, history, and geography.

(β) A mathematical group.

(γ) A natural science group comprising botany, zoology, physics, chemistry, and mineralogy.

(δ) A group whose aim is skill or taste rather than knowledge; it consists of physical training, drawing, and vocal music. The time devoted to this group and to religious instruction remains fairly constant in all schools.

To name the different branches of study is merely to outline the picture which the official programmes enable us to fill in, since they carefully set forth the aim which is to guide instruction in each of these branches, the scope of each in respect of subject-matter, and, in general terms, the method by which each is to be taught.

'The instruction in the mother-tongue, in religion, and in history is of the foremost educational importance.'[1] Religious instruction is denominational. 'The adhesion of the pupil to a definite ecclesiastical body lays upon the school the duty not merely of removing all hindrances to the practice of his religious duties, but of furthering that practice in a positive way, provided the organisation of the school is not thereby disarranged.'[2] The study, being of great significance, must be co-ordinated with other parts of the curriculum. 'It is important that in the several institutions religious instruction be not too desultory, but that it be set without artificiality in the closest relation with all the other subjects of study. In no other branch of instruction is it so true

Religion.

[1] *Lehrpläne*, p. 20. [2] *Op. cit.* p. 74.

that the principal condition of success lies in the personality of the teacher, and in his being possessed by his subject.' [1]

The general aims in view in the teaching of the mother-tongue are the acquisition by the pupil of the power to express himself both orally and in writing, a knowledge of literary history, and the awakening, by means of German literature, of a patriotic spirit. In history he is to become acquainted with the epoch-making events of universal history, more especially as these concern Germany and his own State; and, on the formal side, he is to note the causal connection of events, and to be aided to develop 'the historical instinct' so-called—the disposition, rather, to regard all questions in the light of their past. One of the 'Notes on the Method' of Latin may be quoted here. 'A point of view too little regarded hitherto, yet an important one in respect of correlation of subjects, is the establishment of a close connection between the prose read by the class and their historical exercises. Valid for German and for all foreign languages, the practice is especially good for Latin. By its means an idea is gained of outstanding portions of ancient history and of conspicuous persons made living by the presentation of strongly marked features.' [2]

Vernacular.

History.

The outlook upon morality and culture of the studies in history and in the vernacular is to be given a Teutonic colour, a recommendation which, however regrettable upon strictly humanist grounds, is easily understood when one recalls the mischief wrought in Germany by the absence of a patriotic spirit in the past, and the enormous material progress of to-day consequent upon the establishment of the Empire. But the injunction

[1] *Op. cit.* p. 11.

[2] *Op. cit.* p. 31.

to impart a precise political bias—'political' in the narrow sense of 'partisan'—to historical study in the schoolroom, serves as a reminder of a possible danger following in the wake of a State control of secondary schools, where that control is chiefly centred in the executive government. 'The information concerning economic and social questions in their relation to the present day which is prescribed [for the two highest classes of a nine-year course] requires a particularly sure tact and great discretion in the choice and treatment of appropriate matter. The instruction, conveyed in an ethical and historical spirit, must on the one hand go into the justification of many social claims of the present time, but, on the other, it must set forth the destructiveness of all violent attempts to alter social arrangements. The more it deals with the actual historical development of the relation of classes to each other, and particularly to the position of the working class, and avoiding bias, the more it points out the steady progress to better things, the sooner will it succeed in fitting our youth, because of their sound sense, for a clear and dispassionate judgment concerning the disastrous nature of the unjustified social strivings of the present. This economic instruction may be intermingled, without any forcing, wherever in the course of history the solution of social and economic questions has been attempted. Where the history of recent centuries affords the opportunity of placing before the pupils the social and political measures taken by the civilised European States, there arises spontaneously the transition to a representation of the services of our reigning dynasty down to the most recent times in advancing the people's well-being.' [1] The possibility of combining an unprejudiced historical inquiry with an

[1] *Op. cit.* p. 48.

encomium on the reigning house is one of those assumptions which are always to be expected from a bureaucracy.

Geography.

The study of geography includes the intelligent observation of the neighbourhood of the school, the interpretation of maps, a knowledge of the physical formation of the earth's surface and of its political divisions, and of the rudiments of mathematical geography. The practical use of the subject to the pupils must be kept in view in all schools, and in schools other than Gymnasien special attention is to be directed to its commercial side.[1]

Foreign Languages.

The aim of the instruction in Latin and Greek is upon 'the sure basis of grammatical training' to enable pupils to understand the classical writers and to introduce themselves to the intellectual life and culture of the ancient world. The formal discipline gained through these languages in the Gymnasium, or through Latin in the Realgymnasium, is to be extracted from a modern foreign language in the two classes of Realschulen; the aim of the teaching of French—or of English, if that be the foreign language chiefly studied—in the Oberrealschule is to understand the most important writers, to be able to speak and write French (or English), to have some knowledge of the chief chapters in the literary and social life of the French (or English) people, and 'insight into the grammatical system of the language.' Similarly, the Realschule aims at giving comprehension of the easier works of modern times, linguistic training, and a certain facility in the written and spoken language.

'The main task of the mathematical instruction in secondary schools consists in a training of the mind

[1] *Op. cit.* p. 50.

which will enable the pupil to apply correctly to independent work the intuitions and knowledge which he has gained. In all parts of the subject a clear understanding of the theses to be developed, and of their deduction, must be sought, as well as practice and adroitness in their application.'[1] In like manner, natural science is studied for the promotion of general culture. The boy is to be taught to observe, to describe his observations correctly, to get an insight into natural sequences, and to appreciate the importance of natural laws for everyday life. 'He must also learn to understand, so far as is possible in the school, the ways in which the knowledge of these laws has been and can be attained. Observation and research must take a larger place in the instruction.'[2] This is interesting as a comment on the 'Heuristic method,' showing at once a sense of its limitations under school conditions and a desire to make a greater use of it in school than is generally done on the Continent, where research methods are regarded as distinctly belonging to the university stage, or to technical institutions.

Mathematics and Science.

Drawing is presented in the *Lehrpläne* as a *useful* thing which enters into many branches of study. The great aim is to get boys to see correctly (an aim often overlooked by theorisers on the teaching of this subject), and to represent simple objects in outline. Lastly, the instruction in gymnastics and drill is to promote physical development, harden boys' bodies, awaken courage and self-confidence, habituate to prompt action, and train certain forms of dexterity which are of advantage in military service.

Drawing and Gymnastics.

It will be noticed that there is no intention to oust

[1] *Op. cit.* p. 57.

[2] *Op. cit.* p. 65.

liberal studies in favour of technical instruction even in the schools of the more modern type. The underlying principle is rather that to which Matthew Arnold gives expression in a well-known passage. 'The rejection of the humanities by the realists, the rejection of the study of Nature by the humanists, are alike ignorant. He whose aptitudes carry him to the study of Nature should have some notion of the humanities; he whose aptitudes carry him to the humanities should have some notion of the phenomena and laws of Nature.' [1]

The Prussian 'Educated Man.'

Formerly the Gymnasium was regarded as the school which gave the highest type of education, and it was the Gymnasium's peculiar privilege to pass on to the full enjoyment of all university studies those of its pupils who completed its course successfully. Other secondary schools qualified students for admission to some only of the university courses. But with the publication at Michaelmas 1901 of the 'Lehrpläne' now in force, effect was given to the principle that all Prussian schools having a nine-year course stand at the same level of general intellectual culture. Consequently all three kinds of school from that date onwards have secured admission for their pupils to the university courses which are the recognised avenues to a degree.

The bearing of this fact upon the present inquiry is important. The modern German university is not a place of education in the sense in which English universities undoubtedly are. A distinguished Berlin professor has said: 'In Germany the university teacher is not an educator.' [2] The English boy or girl prolongs at the university the general culture which began in the school. The German undergraduate or university

[1] *Higher Schools and Universities in Germany*, p. 175.

[2] Paulsen, *Die höheren Schulen Deutschlands*, 1904, p. 18.

student learns the application of scientific method to one or more of the several branches of knowledge, whether natural science, philology, history, theology, or what not. Such studies are possible only for 'the educated,' and, according to German opinion, culture or general education is the business of the higher type of secondary school. It follows that the courses of instruction laid down for the Gymnasien, Realgymnasien, and Oberrealschulen indicate very clearly what Prussia understands by the phrase 'an educated man,' so far, at least, as intellectual equipment is concerned.

Primary Curricula.

The subjects of instruction in Prussian primary schools are religious knowledge, the mother-tongue, arithmetic, geometry, 'Realien' (*i.e.* history, geography, rudimentary science), drawing, singing, gymnastics (for boys), or needlework (for girls). Religious knowledge excepted, this list is almost an enumeration of the studies of the English public elementary school, and there is also very material agreement between the school courses reviewed above and that prescribed by the English 'Regulations for Secondary Schools.' The French secondary courses are described in the next section.[1] The French primary curriculum comprises moral instruction (which also appears in the English code), the mother-tongue, arithmetic, geometry, history, geography, civics, rudimentary science, drawing, singing, gymnastics, and manual exercises, these last also forming part of the official programme for English secondary schools.

FOR REFERENCE AND FOR FURTHER READING.

Lehrpläne und Lehraufgaben für die höheren Schulen in Preussen von 1901, pp. 110. Halle, the Waisenhaus, 1904.

[1] See below, pp. 100–1.

There is a translation of the *Lehrpläne* of 1892 in *Special Reports on Educational Subjects*, vol. iii. (Cd. 8988), by W. G. Lipscomb, under title 'The Curricula and Programmes of Work for Higher Schools in Prussia.' The translation is brought up to 1901 by A. E. Twentyman ('Notes on the Revised Curricula,' &c.) in *Special Reports*, vol. ix. (Cd. 836).

Plan d'Études et Programmes d'Enseignement dans les Lycées et Collèges de Garçons, pp. xli + 212. Paris, Hachette.

Organisation Pédagogique et Plan d'Études des Écoles Primaires Élémentaires. Paris, Delalain Frères, 1905.

J. Welton, *Principles and Methods of Teaching*, Chap. II.

SECTION VII

QUESTIONS SUGGESTED BY THE ESTABLISHED CURRICULUM

Prussian Curriculum Summarised.

THE official programmes delineate the Prussian ideal of the 'educated person' at the age of nineteen or twenty, when he is ready to enter upon his life's work, or to prepare for it more specifically at the university. The schools have tried to cultivate in him a manly character, at once moral and religious, lodged in a healthy, well-developed body; they have aimed at exercising his mind and endowing it with a fund of knowledge both literary and scientific.

Imparting knowledge is naturally the topic which is most noticeable in the *Lehrpläne*. The boys in the great majority of cases live at home within easy access of their school, school-hours and preparation-hours are long, and the social side of school-life is not so prominent as it usually is in a well-managed English day-school. But it must not be forgotten that the studies, being predominantly humanist, readily lend themselves to a treatment which directly subserves the training of character. The moral ideal is found in the *Lehrpläne*, and it is not there for ornament's sake; further, it is not always realised amongst ourselves that the national, or racial, ideal deeply affects the lives of those who resort to the secondary schools of Germany. The young German of to-day, no less than the young Frenchman, is developing a cult of the

Fatherland which is not unlike the passion of an ancient Greek for his native State.

Humanist and 'realist' studies form integral parts of the programmes of the Prussian secondary schools of all types, the former predominating; and of the humanist studies language is chief. While two or three foreign languages are studied, the mother-tongue is carefully taught in every school; the purposes in view are that the pupil shall be able to express himself, that he shall gain a knowledge of literature as such, and through foreign literature make acquaintance with human life beyond the German frontiers. His studies in history and geography also serve this last object. History also helps the boy to understand the present in the light of the past, fosters his patriotism, and is intended to guard him against an influence which most Continental executives regard as a disintegrating force in the State.

These are the concrete gains from literary study. But the *Lehrpläne* expressly value the formal as well as the material aspect of knowledge. The humanist studies are said to give a training through grammar which is counted as indispensable as the even more abstract training given by mathematics; Latin is the vehicle of the grammatical discipline, except in the Latin-less schools where French or English takes its place, so far as is possible.

Of the realist studies other than history and geography, natural science is chief. The 'educated person,' according to the Prussian standard, has been trained to observe, to appreciate causal connections in the natural world, and the manner in which they are known; on the material side, he realises the importance of a study of natural science as a useful thing, and himself has made some progress in more branches than one. Finally, skill in delineating simple objects is

expected from him, though he does not practise drawing on æsthetic grounds.

Questions Suggested.

The foregoing summary of what the Prussian curriculum is intended to effect raises many questions of varying scope and importance, some relating to details of organisation or of method, others relating to things fundamental. For example, what countenance do the *Lehrpläne* lend to the belief that mental gymnastic has a considerable value in itself, over and above the particular kind of knowledge acquired in the exercise. Is it true that *what* is learned is of small importance provided the mind is trained? Again, should the curriculum be mainly humanist in character? If so, what is the educational function of literature? Are Latin and Greek indispensable to the discharge of this function? Once more, is the Prussian schoolboy overburdened with work in consequence of the admission of new studies to the school course? Why are languages other than the vernacular insisted upon? Further questions are suggested by the unwillingness displayed in the German regulations to permit a free individual choice of studies; different points of view are evident in the organisation of the English school with its 'Sides,' classical, modern, scientific, and the entirely separate institutions of the German system.

Mental Gymnastic.

In laying down the several aims of the studies, the *Lehrpläne* certainly show appreciation of the value of the formal aspect of knowledge. But they do not share the extreme opinion that the great purpose of study lies in a gymnastic more or less self-centred, a thesis that requires for its maintenance a distribution of intellectual powers into distinct and almost independent faculties, each of which is capable of responding in a general way to exercise of a particular sort. Thus 'Memory is

trained by learning poetry, or grammar or dates'; any one of these very specific exercises trains a supposed general power of retaining any form of knowledge. Similarly, mathematics trains 'reasoning'; so that no distinguished mathematician can fail to be right when he applies his 'general ratiocinative faculty' to the particular affairs of everyday life.

Such a misreading of the facts of consciousness has long ceased to retain the respect of serious students of psychology, though it is unhappily still able to work confusion in the aims and methods of persons interested in education. The Prussian programmes give it no support; they do not suggest that formal instruction as pure gymnastic is an end in itself. The form which they aim at is logical form within a well-defined area of knowledge, the casting that knowledge into a general and systematic shape. Form is valued because of its matter, not apart from it.

The Humanities and Conduct.

On what grounds may the Humanism of these German school courses be justified? An adequate reply would lead the questioner far afield. Plato laid it down in the 'Republic' that the purpose of education is to bring about a duly balanced exercise of function, the harmonious action of the several parts of the soul and of the body, an action not constituted by knowledge alone, nor by skill alone, nor by habit alone. It is directed to activity; and the distinctively human activity is conduct, which, in turn, is the expression of character. Thus the end of education, stated in the most general form, is the establishment of character in the individual; in Plato's view, the character which is defined by his conception of the harmonious relation of mind and body.

Probably the great majority of those who have philosophised about Education agree that the true and

ultimate purpose of the process lies in the sphere of morals. The agreement, however, is formal only; directly the question is put, 'What sort of character is aimed at by Education?' the agreement disappears. But the philosophers, small and great, are not alone in this formal accord and material discord; the position is the same amongst all who concern themselves with the education of the young. Very various, indeed, are the statements of the aim of Education: gaining a livelihood, improving one's social standing, securing place or pelf, advancing the material interests of the community —all these, as well as more noble or more ignoble reasons for educating a child are alleged daily. But while these reasons may be diverse, or even incompatible, all agree in expressing their advocates' ideas of the *summum bonum* of human life. Thus these empirics, like the philosophers, raise the central problems of Ethics; in the last resort, the question, What is the ultimate end of Education? is a moral question, and therefore one which lies outside the province of educational theory.

The 'Republic' of Plato treats the educational problem chiefly from the standpoint of the State; the interest of the community requires that the best be made of every one of its members. But the citizen is an individual as well as one of a community; to attain *his* best, he must reach that harmonious development of his nature which Plato's allegory calls for on the ground of State policy. He must gain his livelihood, or in some other fashion fill his peculiar place in the community; but his services as citizen and bread-winner do not exhaust the possibilities of his life and development. He has other needs than those which are met by exercising political or professional offices; the highest Greek thought included a fitting employment of leisure among the essential constituents of civilised life. For the

employment of leisure makes a sort of man, forms a character.

'We must do what is necessary and useful,' said Aristotle, 'but still more what is *fine*.' Perhaps the most distinctive feature of the Aristotelian 'fine' or liberal instruction is its disinterestedness; the 'fine' study or exercise is pursued not for any extraneous gain such as money or applause, but as a means of expanding the spiritual and physical life—though the distinction implied in these two adjectives is not one which a Greek would emphasise. Purely mechanical arts were not 'fine' or liberal, since they were usually acquired for gain, and always monopolised time, so that those who practised them had no true leisure. Even a thing so essentially fine as music ceased to be so if exercised professionally.

Liberal Studies.

This scorn of professionalism and high esteem of cultured leisure, so characteristically Greek, has become a part of the tradition which governs, or till very recently governed, English university education. Its great merits are commonly recognised and appreciated, but it is well to remember that it has defects. Obviously it may readily pass into dilettanteism, or a failure to value positive knowledge at its proper worth. While it might serve as the educational ideal of a leisured class in the small city states of ancient Greece, a class which made its economic foundation upon a large slave-population, it does not follow that it will serve equally well as a criterion which may be applied to all forms of secondary and higher education in a modern State, more especially if that State be democratic, or quasi-democratic.

On the other hand, probably no time more than our own ever required to be reminded of the claims of culture and of the nature and function of leisure.

A commercial age tends to confuse comfort and convenience with civilisation, to debase its ideals to a material and utilitarian level. Business prosperity frequently makes possible a luxury which ignores taste as an element of urbanity. The tradition which has passed from the Greeks into English higher education, and the literary studies which give that tradition shape are undoubtedly great correctives of a vulgar materialism. To quote Aristotle again: 'To seek utility everywhere is by no means the way of free men with a sense of their own dignity.'

If, then, the chief purposes of education include the training of character, the formation of an organon or criticism of life, and the cultivation of taste, and for these purposes appropriate studies are sought, they will be found most abundantly and most readily accessible in the humanist group, in religion, literature, history, and philosophy rather than in the natural sciences. But the last are also indispensable, not alone for their practical use, but also on account of the modifications which their study effects within the humanist group itself. It has been made clear to our own age that not only the method of knowledge but its substance also has been profoundly influenced by the study of natural science. 'On ne peut sans danger rester étranger aux choses de son temps' is a warning we owe to Descartes.

Of all the humanist studies, the first place in the German and French curricula is occupied by literature.

Literature, Ancient and Modern.

Its æsthetic value apart, the strongest claim of literature to universal employment as an instrument of education lies in the fact that it offers a criticism of life; in Letters the student sees men reflected in their strength and weakness, he begins to conceive ideals, to understand something of the ways by which those ideals are approached, of the forces which counteract

and obstacles which hinder. Literature extends and heightens his human associations by admitting him to intercourse with the choicest spirits. Whatever be the ultimate purpose of education, the sympathy and knowledge thus implanted in the student's mind cannot but help him to fill his place in a society of men ; and in no other school-study are such sympathy and knowledge so readily and so abundantly available.

Is it only through Latin and Greek that these advantages of the study of literature can be secured ? The differences between ancient and modern life and the literatures which reflect them are great, and of educational importance, but it will scarcely be contended that they are essential differences. The controversy of Ancient *v.* Modern is often obscured by a failure to note that more than one issue is raised. For example, the place of literature in education is a thing quite independent of philology, or of any other formal study of language. As an introduction to the science of language, Latin is no doubt superior to any modern European tongue and to ancient Greek also. But this particular claim of Latin to inclusion in a school course may be safely dismissed from an argument which is concerned with the material, literary, humanist aspect of languages. Again, the peculiar advantages which were ascribed above to literature as compared with natural science are not to be derived from a simply rhetorical treatment of a language ; the purely artistic enjoyment of literature is not possible for all minds, and, whether or no, art as such is not that criticism of Life which literature has been declared to be. If literature as art alone were made the instrument of education, the controversy would not be between ancient and modern, but perhaps between Greek and all available languages, Latin included.

But while Latin literature is so markedly inferior,

as pure art, to Greek, of which it is confessedly an imitation, the Latin classics enshrine a spirit which has dominated, and even now in many quarters directs, the civilisation of Europe. There is, in short, a Latin *v.* Greek controversy as well as a controversy between Moderns and Ancients.

It may be urged on behalf of the modern languages that, though the Greek speech be one of the greatest achievements of the human mind, we are not on that account compelled to refuse the epithet ' great ' to other literatures, modern or ancient. The Latin spirit also has entered fully into the Romance, and, more particularly, the French literatures and civilisation, where the student of French may come within its influence. It is true that the great unfamiliarity of Greek life, regarded from present-day standpoints, makes the study of its literature by ourselves a notable enlargement of our conception of human nature, and therefore a potent instrument in our education. But the French and the German mind and outlook of to-day are very different, while both differ from the English. Something of the extending of the mental horizon which comes from the learning of Greek may be obtained by learning two or three modern foreign languages, as time serves and other claims allow. Moreover, the ease with which foreign countries are now visited gives the learner an advantage in this respect which the student of Greek must forgo, or which a visit to Greece can only very imperfectly realise.

It is sometimes objected against the modern literatures that their strongly national idiosyncrasies prevent their doing for the student what the catholicity of the ancient classics effects almost unconsciously. At first sight this appears to be an inversion of the previous argument in favour of Greek. Those who speak the tongue of Shakespeare, at least, will probably be slow

to admit that modern literatures are necessarily less catholic—that is, less humanly comprehensive than ancient. But, in any case, the narrowness, if any, of our modern speech may be corrected by a study of another, or others. If there is anything in the argument, it affords a reason why an English boy, or girl, who can only compass one foreign language, should learn French rather than German.

The conclusion seems to be that the ancient classics are not indispensable for such humanist instruction as best serves educational purposes. We may admit that they are the best means without allowing that there are no others. The differences between ancient and modern literature, as judged by the educator, are differences of degree, and the degrees are not so far apart as to make a consideration of other claims than those of humanist education superfluous. Neither ancient nor modern literature can achieve all that is educationally desirable. For very many boys and girls those other, non-literary demands are many and urgent, and, in their case, the indispensable study of literature may be found in the languages of to-day.

But while the humanism of the German *Lehrpläne* is justified, their ' realism ' is also essential. No man can live a full life in a scientific age who has no conception of scientific method, no sympathy with the scientific spirit ; wilfully to ignore these great factors in the life of to-day is to refuse to share in that fulness and comprehensiveness of man's life which it is the very object of humanism to attain. At bottom, there is no antagonism between literature and natural science ; both are products of the human mind, complementary, not antagonistic.

Positive Knowledge.

While the human argument, as it might be called, for the inclusion of natural science in the school-course is strong, the argument from utility (surely not a

negligible argument !) is sufficiently obvious. If school-education is to be predominantly humanist and unspecialised, it will fall to the universities and technical colleges to give their students the realist or specialised instruction required by everyday life; that is, we must adopt the usual Continental view—'general education in the schools, scientific method and its application in the universities.' Where the school-life is short, or does not lead to a university career, the school-course itself should afford something of this realist instruction, liberalised in aim and in method, but retaining a positive value.

The ever-growing number of more or less separate branches of knowledge which have established themselves in the German schoolroom has long been matter of concern to those at the head of affairs, who have not forgotten that knowledge is a system, not an accumulation. The measures taken to compensate for the increase of subjects have not checked the tendency to add more, nor have they convinced some objectors that Prussian schoolboys are not overworked.

An Over-crowded Curriculum.

Chief among the critics is the distinguished Professor Paulsen of Berlin, who declares that the pupils of the Gymnasium suffer from an overdose of schooling ('Schulmüdigkeit') in consequence of a divided aim, or double aim, to which he gives the name of Utraquismus, an attempt to combine the old classical culture with the modern education in living tongues and natural science. 'It is impossible to expect from the average schoolboy the attainment both of the classical education of the scholar and of a purely modern culture also. . . . For the majority of our schoolboys, even those destined to scientific studies at the university, the education by means of living languages and science is a less superfluous thing than the so-called classical training. They

require a school addressed more to the present, a modern Gymnasium.' [1]

But the complaint that too many subjects are brought together into the same course is not confined to the classical or semi-classical schools. The extension of the field of knowledge is certain to be followed, wherever a school's first and greatest affair is with knowledge itself, by the gradual introduction into the class-room of some of the new conquests. A similar sense of dissatisfaction therefore arises against the Realschulen as against the schools which teach Latin. Meantime, the establishment of the German Empire under the leadership of Prussia has wrought a transformation in the economic condition of Germany and in the material life of the people. The many civic privileges attached to education at a Gymnasium became objects of desire to parents residing out of reach of this first-grade type of secondary school, for, owing to the cost and the small number of pupils to be expected in some places, this is a possible thing even in Germany. Where circumstances caused no such difficulty to be experienced, it was yet felt that the rigid separation between one type of secondary school and another was too inelastic to meet satisfactorily the new conditions of German life.

The 'Reformed Schools.'

These different grounds of dissatisfaction found expression in the establishment of what are called Reformed Schools, an account of whose beginnings is given by Professor Sadler.[2] The modifications in organisation, curriculum, and method aim at a fuller development than usual of modern studies, and a greater elasticity than is feasible where Gymnasium and Realschule are absolutely distinct establishments. There

[1] *Geschichte des gelehrten Unterrichts*, ii. p. 643.

[2] *Special Reports*, vol. iii. pp. 200 ff., and vol. ix. pp. 108 ff.

are two types of Reformed School, following the models respectively of Altona (a combination of Realgymnasium and Realschule) and of Frankfurt (combining Gymnasium with Realgymnasium). The Altona type dates from 1878, the Frankfurt from 1892; but the latter has had a far greater number of imitators.

The combination is effected in the main by making the three lowest classes a sort of 'Lower School,' or base common to both divisions. The boys of this lower school, whose ages range from about nine to twelve, learn no Latin, physics, or chemistry, but all learn French and natural history, as well as the German, mathematics, history, geography, religion, and drawing which may be expected in these forms. While the Prussian *Lehrpläne* direct that, if Latin is taught at all, it must be from the outset and two years before French is begun, the Reformed Schools adopt French as the first foreign language to be studied, and postpone Latin till the boy at about the age of twelve has passed out of the lower school.

The Frankfurt Programme.

The Frankfurter Lehrplan, the systematised curriculum followed in that city since 1892, is of sufficient intrinsic importance to deserve some attention in detail. Its interest is not confined to the schools of Frankfurt, nor to the eighty or more German schools elsewhere which were employing it in 1905. It has opponents as well as admirers, but all admit that it is a noteworthy experiment in reconciling ancient and modern studies, and in providing Germany with a more elastic organisation of secondary schools.

As has been said, the Frankfurt plan combines a Gymnasium with a Realgymnasium, the bifurcation taking place after Form IV. is passed. But a closer parallelism of studies is maintained between the lower classes of the two divisions of the upper school than

is the case in the national *Lehrpläne*; for example, while the latter direct that Greek must begin in Lower III. (*i.e.* at twelve years of age), at Frankfurt it commences in Lower II. (*i.e.* at fourteen). Thus the passage of a scholar from the one side of the school to the other is not very difficult up to Upper III., a fact of great advantage to the boy who is late in 'finding himself.'

There are one or two noteworthy features in reference to method. Of these the most striking is the employment, when a new study is being handled, of what is called 'the intensive procedure.' For example, French and Mathematics are the leading studies of the lower school (Forms VI.–IV.); every boy gives six hours a week to the first and five to the second.[1] But when the boy goes up to the Gymnasium, French occupies him for three hours a week in his first year (or class) and two hours a week thereafter; a similar though not so great a reduction of hours takes place in his mathematical work. On the other hand, the boy in the Gymnasium devotes ten hours a week to Latin in III., thereafter eight hours till the last year, when the *quantum* is seven. Beginning Greek in Lower II., he gives eight hours weekly to this subject throughout the remainder of his stay at school. In the Realgymnasium, the hours are more evenly distributed between the several subjects; but English begins with six hours a week in Lower II. and gets four hours weekly in the remaining three years. English schools which have been embarrassed by an influx of pupils backward for their age in Latin or in French have found some relief by employing this 'intensive' plan.

The adoption of French instead of Latin for the purposes of a common grounding in linguistic study

[1] These are hours spent in school at class-work. The *Lehrpläne* do not, of course, give the time spent in preparation at home.

forbids the exclusive use of conversational or purely oral modes of instruction, which are supplemented by careful attention to grammar. Economy of effort and of time is secured by the employment of 'parallel grammars'—that is, text-books which retain a common terminology as far as possible, whether the language be French or Latin or Greek. Similarly, the vocabulary of the earliest Latin exercises is reminiscent of the words learned in French. The aim in all languages is to introduce the learner as early as may be to the reading of authors.

Many advantages are claimed for the Frankfurter Lehrplan. Thus, the comparative ease with which, up to an advanced stage, a pupil may for good reasons pass from the Gymnasium to the Realgymnasium, or *vice versa,* is much appreciated where, as in Germany, a boy's schooling so closely determines his future profession. Contrariwise, the compulsion to choose at the early age of nine or ten whether a boy is to enter a Gymnasium or an Oberrealschule, institutions which in the past at least have assumed that their pupils will follow very different careers in life, cannot but result in some misdirections and the laborious adaptation of square pegs to round holes. Again, the due adjustment of primary and secondary school courses so as to secure the interests of the nation in her ablest children of all ranks without prejudice to average minds, is a problem which is rapidly becoming acute in all European States that debate educational questions at all. It is claimed that the passage of able boys from the elementary school system to the secondary is easier under the Frankfurter Lehrplan than under the ordinary Prussian scheme. A further amelioration of social relations is anticipated from the common schooling undergone in the first three classes. Small towns which would find a separate Gymnasium beyond their means or requirements can

secure through the Frankfurt organisation a classical education for a few boys without detriment to the interests of a larger number who prefer the instruction which is given in a Realgymnasium.

Its adversaries have said that the Lehrplan divests education of its humanist character. Dr. Reinhardt, the director of the Frankfurt Gymnasium, replies that the reformers are constructing a new institution in which, if the old Gymnasium prove unable to withstand the pressure of facts, the ancient languages will occupy a less extensive, but on that very account a more assured, territory.[1]

'Sides' or Schools?

The organisation of these German Reformed Schools is of peculiar interest to English people, as it exhibits an approach in principle though not in detail to our division of a school into 'Sides,' as well as to a freer option of studies than educational opinion abroad has in the near past deemed advisable. Germany is discovering that her established curricula would be more effective if they were less rigid, and that the comparatively simple system of schools inherited from the past is at odds with her present economic condition and consequent educational needs.

We are wont to attribute to racial peculiarity the comparative confusion which dominates our own scholastic arrangements. Englishmen, it is said, do not readily reduce things to a system, they are not distressed by logical contradictions of the formal order; in some matters, education being one, the merely negative attitude is replaced by a positive refusal to systematise. This general explanation probably contains much truth. It is also possible that the absence of a simple logical classification of English schools indicates an

[1] Rein, *Encvk. Handbuch der Pädagogik*, vol. ii. p. 989.

instinctive sense, on the part of the English people, that such a classification is quite inadequate when it confronts the complexity of the national life which schools exist to subserve. In other words, the chaotic or seemingly chaotic state of our educational arrangements may be the result of a half-conscious but salutary process of trial and error, empirical in the extreme perhaps, but consistent with healthy growth.

French Secondary Curriculum.

The increasing complexity of organisation which marks the tendencies of the German reformers is visible also in the very material changes introduced by the French into their secondary school system by the *Plan d'Études* of 1902. This document distributes the work of the *Lycées* over a period of seven years, the first four of which (that is, the time of the pupils' sojourn in Classes VI. to III.) are devoted to establishing a foundation upon which the separate courses of the last three years are raised. The studies of the four preparatory years fall into two groups, the first being predominantly classical (Latin is obligatory, but Greek is optional), the second mainly scientific and including no Latin. A pupil takes one of these two groups; but, as in the German Reformed School, the passage from one 'side' to the other is rendered easy in order to rectify any initial mistake in the placing of a pupil. Of course, neither the French nor the German practice contemplates the possibility of a boy's being on both 'sides' at the same time. Further, these four years constitute a course complete in themselves, in which respect they may be compared with the first six years of the Prussian secondary school of all types.

Upon this foundation, four several courses (each of three years) are built, and to one or other of them the boy is drafted who proposes to remain at school beyond

the age of sixteen, or thereabouts. These courses are, as to their chief studies :

A. Latin, Greek.
B. Latin, Science.
C. Latin, Modern languages.
D. Modern languages, Science.

A is the analogue of the Gymnasium, B and C of the Realgymnasium, and D of the Oberrealschule.

Educational Experiment.

These German and French modifications of the courses of instruction have been consciously directed by principles clearly formulated and generally understood. Until the quite recent organisation of the Board of Education, changes in the English curriculum have been tentative, depending upon the initiative of individual teachers. Probably the most influential of English reformers of instruction in our time are the mistresses of the High Schools ; but in true British fashion they have been too busy in making history to preserve leisure in which to describe or analyse it.

Therefore, we may not flatter ourselves too much when we recall foreign approximations to our own practice. Our procedure may be called ' experimental ' : but our experiment is only of scientific value when guided, or at least interpreted, by an intelligent hypothesis. The recent experience of foreign countries shows conclusively that we ought not to seek the simplicity of curricula and of organisation which once distinguished French and German secondary education ; but the same experience makes it clear that we must experiment and organise in the scientific manner. Whatever the complexity of our hierarchy of schools, the components of our curricula, or the options permitted to individual pupils, all need to be governed by the common purposes which they are all supposed to serve.

While we shall do well to learn all that others can teach us, it is also well to remember that most foreign official curricula reflect the belief that in education knowledge is the thing of greatest importance. Our own tendency is with Locke to place 'learning last and least.' The salutary course is doubtless in the mean between these extremes. Our experimenting will be more fruitful if, while frankly admitting the claims of Knowledge, it does not spring from too academic an opinion of the nature and aims of education and of the kind of mind which in the interest of the community most requires educating. The curricula and methods of the past have been framed too exclusively for the fostering of one particular kind of excellence, and that a relatively rare one amongst men. We should recognise that there are other types of human excellence than those which distinguish the scholar, the man of letters, and the *savant*. The man of affairs (whether these be affairs of State or of private 'business') the actively constructive minds of the engineer and mechanical inventor, the head of a household and all the various degrees of these are certainly as necessary members of the polity as are the men and women of more severely academic achievements. There is ample room for experimenting with the hope of discovering what courses and methods of instruction are likely to elicit and train these less scholastic forms of ability.

Foreign experience should help us to understand that such wholesome experimenting is not made easier by the existence of a highly organised central administrative body called upon to deal with the educational affairs of a nation. In the nature of things, the first demand made by a bureaucracy is for uniformity, and bureaucrats are not always quick to detect the uniformity of death. It is to the advantage of all concerned that in the national scholastic economy there should

remain a minority of institutions and of teachers who are independent even of an enlightened Board of Education.

FOR FURTHER READING.

M. E. Sadler, 'Problems in Prussian Secondary Education for Boys, with special reference to similar questions in England.' (In *Special Reports on Educational Subjects*, vol. iii. Cd. 8988. Also printed separately, price 1*s*. Eyre & Spottiswoode.)

M. E. Sadler, 'The Unrest in Secondary Education in Germany and Elsewhere.' (In *Special Reports*, vol. ix. Cd. 836.)

F. Paulsen, *Geschichte des Gelehrten Unterrichts*, 2 vols. 2nd edit. 1896-7. See especially vol. ii. pp. 634 ff. 30 marks.

G. Leygues, *L'École et la Vie*, pp. v + 407. Paris, Calmann-Lévy. 2nd edit. 1904.

A. Croiset and others. *Enseignement et Démocratie*, pp. ii + 344. Paris, Alcan, 1905. 6 frs.

J. Ziehen, 'Frankfurter Lehrplan' in vol. ii. pp. 985 ff. of Rein's *Encyklopädisches Handbuch der Pädagogik* (7 vols. 16 marks each, 2nd edit. in course of publication. Langensalza, Beyer & Sons).

Plan d'Études et Programmes d'Enseignement dans les Lycées et Collèges de Garçons. Paris, Hachette.

Raymont, *The Principles of Education*, Chap. VI.

On 'Formal Education,' *vide* Adams, *The Herbartian Psychology*, Chap. V.; and Thorndike, *Principles of Teaching*, Chap. XV.

SECTION VIII

EXPERIMENTS IN CURRICULUM AND METHOD

The Over-crowded Curriculum.

In the essay which opens 'The Public Schools from Within,' Mr. Page says that 'a drastic reduction in the multitude of things which a boy is compelled to learn is just now the reform most needed in education.' The study of the established curriculum which precedes this section bears out Mr. Page's opinion; and what is true in this respect of boys' instruction is certainly no less true of the instruction of girls. But so long as a school's greatest function is believed to be the imparting of knowledge, so long will it be cause of complaint that the curriculum is too scanty or too plethoric. This particular dissatisfaction with schools is, in one form or another, perennial; it is only forced into exceptional prominence in times distinguished by notable progress in knowledge. To be quite fair, it should be admitted that in the nature of the case schools even at their best must lag behind the actual discoverers and framers of the knowledge of the moment.

The educational reformers of the seventeenth century held that the remedy was to be found in method. Be careful to employ the right method, and the school course might be made co-extensive with all ascertained truth. But whatever improvements may be effected by reforms in method (and without doubt they are considerable), reforms in the curriculum are in our day

even more obviously to the point. It is clearly out of the question to expect any boy to take all knowledge for his province. The guiding principle in the construction of a curriculum must be one of selection. Experience seems to show that the course, to be satisfactory, ought to represent each of the four groups of educational activities—namely, the linguistic and literary group, including the vernacular language and literature, the mathematical and natural science groups, and a group constituted by different forms of manual skill, like drawing and the use of tools. To such a grouping of studies the schools of all civilised countries have long been moving.

The selection of representative studies for the different types and grades of school will not alone solve the difficulty. Room and verge enough must be left to the schoolboy, as schoolboy, to do other things besides getting knowledge and skill. And when the representative studies have been chosen, it will remain to reconsider the purposes for which they are studied, and the manner in which the teacher will deal with them. For example, the teaching of literature in the case of most boys and girls should be human first of all, and scholarly afterwards.

Experimental Pedagogy.

In all probability the next vital reform in educational practice will have its origin from a distinctly experimental handling of the problems of method and curriculum. Although these experiments may be considered to be outside the scope of a manual limited by its nature to what is, more or less, the established usage, it is at least desirable that the attention of students of education should not be too straitly confined to use and wont. The present section, therefore, will make brief reference to curricula which have not been generally accepted, and to experiments whose importance is out

of all proportion to the modest scale on which they are being conducted. Many of the conclusions which appear in the second part of this book are the outcome of the authors' experiments in the class-room ; but of these it is not necessary to speak here.

The volume of direct scientific observation and experiment applied to education in the present day is seen to be very large when all its different manifestations are taken into account. The experimenters are confined to no one nation or school of thought : Americans, Germans, Swiss, Belgians, Frenchmen, Englishmen are included in the list. Some are primarily psychologists interested in the development of their science on genetic lines, and therefore keenly observant of facts which throw light upon the growth of the mind from childhood onwards. A very numerous and most active section, having representatives in all European countries as well as in America, is formed by the medical men and physiologists who investigate the hygiene of childhood and of school-life. A third group, much less homogeneous in its constitution than the other two, consists of persons who hold that pedagogical questions are best solved by observation and experiment conducted upon scientific principles ; they claim for pedagogy a position similar to that of medicine in its own field.

Experiments in Curriculum.

The experimenters in curricula, though by no means agreed in their conclusions, share a common trait which reflects the growing interest in the study of human institutions, and that awakening of the social conscience which has been so noticeable during recent years. A sociological—or, if the phrase may be allowed, an ethico-sociological—point of view and mode of treatment are conspicuous in their proposals. But these are also the outcome of a theory originating in an earlier generation

than the present. The majority of the reformers have adopted the postulate that there is a psychology of races and peoples as well as of individuals, and, further, that the mental development of mankind is repeated in the mental history of the individual. They therefore accept the history of culture at large as indicative of the several stages through which every child passes to maturity, and with that proposition for a clue seek the solution of the twofold problem of curriculum and method.

Development, Racial and Individual.

Herbert Spencer stated the general principle as follows : ' The education of the child must accord both in mode and arrangement with the education of mankind considered historically. In other words, the genesis of knowledge in the individual must follow the same course as the genesis of knowledge in the race.' [1]

Parenthetically it may be said that Spencer was mistaken in naming Auguste Comte as the man who first enunciated the theory that the mental development of the individual epitomises that of the race. Comte had been anticipated by Pestalozzi and by Froebel, to name writers on education alone. Thus, Froebel writes in the ' Education of Man ' (1826) : ' Every human being who is attentive to his own development may thus recognise and study in himself the history of the development of the race to the point it may have reached or to any fixed point. . . . Only in this way can man reach an understanding of history, of the history of human development as well as of himself.' [2]

The thought was not uncommon amongst the German philosophers who followed Kant, and to these it had in all probability been suggested by the biologists of the eighteenth century. It was a fact familiar to

[1] *Education*, chap. ii. p. 67.

[2] Hailmann's translation, p. 41.

these last that, before birth, the individual organism, starting from a rudimentary condition (subsequently identified with the cell), develops through varying forms which summarise the process of evolution undergone by a long line of ancestors. The pre-natal life of the creature epitomises those stages of physical development which lie between the rudimentary cell and the form attained by the creature itself at birth.

Herbert Spencer.

The assumed parallelism between the mental evolution of humanity and that of the individual mind furnished Spencer with certain general principles of method and curriculum which he states in the second chapter of his 'Education.' They are such cautious and modest applications of the doctrine, as 'in each branch of instruction we should proceed from the empirical to the rational'; that 'the process of self-development should be encouraged to the uttermost'; that 'a plan of culture' should 'create a pleasurable excitement in the pupils.' It is evident that a more exact and detailed knowledge than we at present possess of the sequence of development in the race and in the individual is necessary, if the doctrine is to yield more than the broadest generalities concerning curriculum and method. Its success is bound up with the advance made in the study of genetic psychology.

Dewey.

The experiments of Professor John Dewey were carried out upon this assumption. While occupying at Chicago the chair of Education, he employed the elementary school, attached as a kind of laboratory to his department of the university, for the study of the psychology of childhood, and for the tentative 'construction of a course of study which harmonises with the natural history of the growth of the child in capacity and experience. The question is the selection of the kind, variety, and

due proportion of subjects answering most definitely to the dominant needs and powers of a given period of growth, and of those modes of presentation that will cause the selected material to enter vitally into growth. We cannot admit too fully or too freely the limits of our knowledge and the depths of our ignorance in these matters.' [1] The history of culture and of institutions was therefore regarded as indicating the kind of activities which should be progressively encouraged as the pupils advanced in age. Thus schooling was assimilated to the ordinary course of life outside the school walls, not from simply utilitarian motives, but from the conviction that 'it is through the social agencies that [the child] recapitulates in a few short years the progress which it has taken the race slow centuries to work out.' [2]

The course began in a kindergarten for children not yet six years of age, whose learning revolved about the familiar experiences of life in the home. The usual school 'subjects' were progressively introduced into the studies of the older children, but not as such; the ordinary course was regarded as having its chief value for the teacher rather than the pupil, in that it served as a systematic and logical statement of human culture which would enable him to 'determine the environment of the child.' Local geography and history formed the 'core' of the studies to which reality was given by handwork with tools, sewing, weaving, cooking, and 'camping out.' Through the various social media included in the practical experiences of the children, instincts were to be aroused and given play, and these through their proper activity would lead the child to the next stage in his mental and moral growth, agree-

[1] Findlay's *The School and the Child*, p. 107.
[2] *Ibid.* p. 110.

ably to the principle of 'initiation in the child's own impulse and termination upon a higher plane.'

These experiments ceased when Professor Dewey gave up his chair in 1904. The records are not readily accessible, but Professor Findlay has happily edited the selection of Dewey's writings from which citations have here been made. A brief bibliography is included. The reader may be more especially referred to the first and last essays in this little book for an exposition of the author's standpoint and method.

Ziller's 'Historical Culture Epochs.'

The most widely known attempt to apply the doctrine of parallel development to actual practice in the classroom is that which is commonly termed the 'Historical Culture Epochs Theory,' called 'die Kulturhistorischen Stufen,' by its author, Tuiskon Ziller, the disciple of Herbart and Leipzig professor, who died in 1882. These 'steps' are intended to solve the problems of curriculum and method by presenting to the pupil historical matter illustrative of typical stages in the national life. By taking these historical studies in chronological order, the pupil is made to retrace the path of development followed by his race, and thus *ex hypothesi* his own development is fostered in the most natural manner.

Ziller's theory is illustrated by the eight years' course which he proposed for the primary schools of Saxony. The historical or quasi-historical material of each stage is considered to be especially adapted to the child whose age places him at that stage, the course beginning on the completion of the sixth year of the child's life. The scheme is as follows :—

First year.—Fairy tales.

Second year.—Robinson [Crusoe].

Third year.—The Patriarchs ; local traditions.

Fourth year.—The Judges of Israel ; the Nibelungen.

Fifth year.—The Kings of Israel; the German Kings.

Sixth year.—Jesus; the introduction of Christianity into Germany; the German Emperors.

Seventh year.—The Apostles; the Reformation.

Eighth year.—Luther's Catechism; German nationalisation.

An outline of the national culture, by another hand, with the implication of appropriate instruction at each stage, is as follows: '1. Hunter's life. 2. Nomadic life; grazing is a new occupation of man; lower animal life enters into the service of man. 3. Agricultural life. 4. Development of retail trade and small industries. 5. Development of wholesale trade; foreign commerce and great industries; growth of great cities.' [1]

It will be noticed that in the first of these schemes the child is eleven years of age before he hears of Christ. It is thought sufficient to reply that 'numerous opportunities are at hand—Christmas, Sunday, devotions, &c.—to provide for this necessary part of the earliest training.' [2] But the hypothesis upon which the course is constructed declares that in his earlier years at school the child is unable to apperceive such teaching. The point suggests a radical difficulty in accepting Ziller's scheme as a satisfactory sequence and statement of the studies which a child should pursue while at school. The course of physical development, which in the case of the race must have extended over a vast tract of time, is compressed in the case of the individual into a relatively short, or even an insignificant, period. The same may be said with respect to the history of culture during the period which lies between the ideas, arts, and implements of primitive man and the thought and activities of civilised races

Van Liew, *Outlines of Pedagogics*, p. 119.
Van Liew, *op. cit.* p. 118.

of to-day. Compare the differences between the single cell, the three-year-old child, and the adult, first as typical stages in the evolution of humanity, and secondly as marking periods of time in the life-history of an individual. What is to be the guide in determining the corresponding compression of instruction in its earliest stages? At least half of each of the two courses outlined above is devoted to periods antecedent to the present. On what grounds may this be accepted as a fair proportion?

But a strict adherence to the historical stages of culture as a guide to curriculum is not possible. Let the stages of a national culture be represented by the letters of the alphabet, starting with A as the earliest stage, and let it be supposed that a child, whose individual development has brought him to the stage F, is living in the actual stage R of his nation's culture. Now, the child being a rational creature, the reaction of R upon F is inevitable; the child of stage F can, in the circumstances supposed, no more escape the influence of R than he can elude his own shadow in bright sunshine. The fact is unfortunate for the theory; for what is likely to become of instruction adapted to stage F for a child surrounded by R? He is no mere duplicate of the men of his race who lived in period F; *his* stage ought, in truth, to be indicated not by that letter, but by $F+x$, a stage which, it is assumed, has never been reached before.

Whatever may be said in favour of these 'historical steps' as applied to literary instruction, they expose their greatest weakness when the teaching of natural science is in question. Presumably not even a fanatic would propose to begin a course of chemistry by lessons on alchemy, nor one on astronomy by a preliminary course in astrology. Yet these exploded 'sciences' played no small part in the development of knowledge.

If insisted upon rigorously, the theory would bring upon itself the condemnation passed by Herbart on Rousseau's dictum that we must 'follow Nature,' the condemnation that we should then be repeating *ab initio* all the evils and mistakes which mankind has had to overcome.

The greatest service to education rendered by the Historical Culture Epochs Theory is its assertion of the pre-eminence of 'the Humanities'—taking the term in its widest sense—as educational instruments; a scheme of studies based upon the theory necessarily assigns a foremost place to literature and history, and particularly to the history and literature of the scholars' native country. In dealing with these studies on historical lines, a few broad principles of method are followed. For example, the manners, thought, and language of a simpler age than his own make a more direct appeal to the boy's mind. Especially are the great moral truths more manifest to his understanding when exhibited in an unsophisticated society, or by the genius of a great literary artist. It is this aspect of the theory which may be traced to Herbart himself, as may be seen in the closing passages of the 'Æsthetic Revelation of the World.' Speaking in the light of his own experience as a private tutor, he says that boys should begin the reading of the 'Odyssey' in Greek between the ages of eight and ten, the barest minimum of grammar serving as an introduction. 'An uninterrupted study of modern times belongs to adolescence; the boy would wander at ease in the earlier world, especially in the old, if he were to begin his Homer as he ought when only just grown out of childhood and its many needs.' [1]

Though the volume of experimental work dealing

[1] Par. 41.

with method as distinct from curriculum is considerable, it has not yet reached the stage of co-ordination, or even of exact formulation in all cases. In England especially it is difficult to say what exactly is being done in this particular field or in the much wider region of 'child-study.' The books of Professor Sully and of Dr. Francis Warner have long been before the public; but, for the most part, English work of this kind must be looked for in papers and memoirs read before societies or published in technical periodicals, in courses of lectures, and in the researches conducted in some of the universities and other places where education is studied scientifically. The Fielden Demonstration School in the University of Manchester may be named in this connection. 'The Principles of Teaching based on Psychology,' the work of an American scholar, Professor Edward L. Thorndike, is one of the first books, if not the first, on the experimental study of teaching which have appeared in English. As the title indicates, this book has a different intention from the studies in genetic psychology associated with the names of Dr. Stanley Hall and other American students of the mental life of childhood and youth.

Experiments in Method.

An early subject of inquiry amongst the experimenters, and one which still engages attention, is the possibility of measuring the fatigue of school children in an objective way. The interest of the problem is by no means confined to its own immediate topic, but is related to a large variety of questions of organisation and teaching. Full information on this inquiry as it stood some six or seven years ago will be found in 'Special Reports on Educational Subjects,' vol. ix. ('On the Measurement of Mental Fatigue in Germany,' by C. C. T. Parez). The reader who desires to make acquaintance with the experimental treatment of educa-

tional questions might find it helpful to begin with this paper; but it must be remembered that much has been done since 1902, and that recent English investigations do not always support the earlier contentions.

As in the case of most branches of scientific inquiry to-day, it is to German work that the student can be most readily referred for information upon the experimental aspect of modern pedagogy. In this connexion the name of Professor Wilhelm Rein is honourably distinguished. His Seminar at Jena, although a kind of Mecca for Herbartians, has always preserved the academic tradition of the freedom of learning, and others than the disciples of Herbart have been made welcome to conduct research with the help of its resources. Periodical reports have appeared for years past in the well-known 'Aus dem pädagogischen Universitäts-Seminar zu Jena.' Dr. E. Meumann, until recently professor of Psychology at Zurich, signalised his tenure of a chair in that university by a long series of psychological investigations into the conditions of various forms of school life and occupation. His own publications have been in periodical form; but two very able volumes appeared in 1905 from the pen of a former member of his Seminar, Dr. Otto Messmer. These are noticed below.

Rein and Meumann.

A leading German authority on the experimental study of teaching is Dr. W. A. Lay, of Karlsruhe. Like his Swiss colleague Messmer, Lay is a teacher in a training college. From his article, 'Experimentelle Didaktik,' in Rein's 'Handbuch' (ii. 210 ff.), an idea may be gained of the aims and methods of the experimenters. He explains that hypothesis, experiment, and verification are the essential stages of this mode of inquiry. 'Every rule and

Lay's 'Experimental Didactics.'

principle of method which "common sense," "tact," "long experience," and routine, knowledge, and ability have set up, or which have been gathered from things in general, or deduced from psychology, logic, and other auxiliary sciences, can only be regarded by didactic experiment as preliminaries—that is, as hypotheses or material for constructing them.' The means open to the inquirer are exact observation, didactic experiment agreeable to psychological method, statistics, and the auxiliary sciences, physical and mental. Amongst the latter he mentions especially the anatomy and physiology of the sensory apparatus and the genetic study of psychology. He names as topics already treated experimentally fatigue, home-work, the periodicity of mental energy exhibited by classes of pupils and by individuals, inquiries respecting the learning of spelling and of arithmetic, and the function of motor-ideas. Lay had himself taken a share in most of these studies before the publication of his book, 'Experimentelle Didaktik,' in 1903.

The ground-idea of this work is that instruction must be directed to and effected by activity, doing. This is expressed in the sub-title, 'Experimental Didactics; its basis with reference to the Muscular Sense, Will, and Action.' Motor-ideas and motor-processes can only be developed through movement; muscular sense and action must be the psychological (*sic*) groundwork of a theory of education and instruction. From this point of view particular value attaches to play, to experimenting, to physical exercises, and to all kinds of manual skill.

Like most of the experimentalists, Lay is a strong dissentient from the doctrines of the Ziller-Herbart school, as it is customary to denote the later followers of Herbart, who find their more immediate inspiration in Ziller. The end of instruction, according to Lay, is

not interest, but a conviction which culminates in action; the Herbartian is too exclusively intellectual. Yet not Ziller himself was more confident than is Lay of the existence of a universal 'Form' of instruction.

Messmer's 'Criticism' and 'Outlines.'

It is to a consideration of the possibility of such a form that Dr. Messmer devotes his 'Criticism of the Theory of the Method of Instruction,' the first of the two volumes to which allusion was made above. The general conclusion reached is that a universal norm is not attainable. 'The cultivation of the fundamental processes of thought, feeling, and will is to be achieved through a series of *different* methods.' Ziller's 'formal steps' are subjected to a searching criticism in detail. That they are psychologically grounded is denied, and it is held that their claim to constitute a universal method would only be weakened if they really maintained their ostensible freedom from logical considerations. 'The processes of logical thought alone possess the prerogative of universal validity.' [1]

Messmer's constructive work is contained in the 'Outlines of the Theory of Methods of Instruction.' Here the main conception is that a sound method of instruction must possess a basis both logical and psychological. The first principle is that 'the methods of instruction must be so contrived that the intellectual activities—sense-perception, reproduction and association, thought—lead to results that are *true*, and that the emotional effects harmonise with those which are implied in the intention of the matter of instruction.' . . . The second principle expressed as a practical maxim is, 'Instruct so that the mental powers of the child are expended most economically.' [2]

[1] *Kritik*, p. 157. [2] *Grundlinien*, p 12–13.

Leaving the consideration of æsthetic and ethical instruction to another occasion, the author works out these two principles in the field of purely intellectual teaching. The first principle or norm he terms objective-scientific: objective because it employs logical methods based upon thinking in general and not upon individual idiosyncrasy; scientific because its methods are those followed by the investigator and researcher. Messmer is careful to say that by logical methods he does not mean the exposition of a science as a fully developed system of knowledge, but the processes of thinking by which the discoverer gradually develops that system for himself. The methods in question are those 'elaborated in the research-methods of the several sciences' (p. 14). As enumerated, these are analysis, synthesis, abstraction, determination ('determination always presupposes abstraction, of which it is the converse'), induction, and deduction. The author's indebtedness to Wundt is acknowledged throughout.

Logical Methods of Research.

It is in connexion with the second principle or norm that the experimental nature of Messmer's study appears and Meumann's work is utilised. This principle is named the subjective-psychological, because it takes effect in methods which have reference to the individual minds of the pupils.

The nature and province of the two norms is set forth in a passage which follows the detailed consideration of the first. A free and abridged rendering of it is here given: 'The methods of instruction developed up to this point maintain their form by virtue of logical considerations related to the thought of the learner. Thought is a product of thinking—*i.e.* something logical. The sum of all the thoughts which we desire to produce in the pupil forms what is usually called the

material of instruction. This is no mere appliance suitable for teaching, or paper and printer's ink, which simply represent the idea of the material. The true matter of instruction, every branch of knowledge in general, exists only in *thinking* persons. And, as we have seen, the method of the teacher is no other than a sum of measures in accord with logical considerations, which begin anew with every subject and every lesson. For the purpose of this first principle the materials which lie ready in the mind of the teacher are sometimes divided into parts (analysis), sometimes set together in a whole made up from its parts (synthesis). These are the essential activities of every methodical contrivance. But the logical considerations of the teacher are always complicated with the obligation to bear the learner in mind also. It might certainly be said that the obligation is discharged in the mere treatment of the subject-matter, for the latter consists precisely in those thoughts which he has to form in the learner. All that is humanly possible would be effected by a strict adherence to the methods so far set out. But this is not so. The methods hitherto described certainly have reference to the learner, but only in so far as he is actually thinking logically. The laws of logical thought operate in the same way in all men. All men think in the same form. Therefore in setting up methods of imparting knowledge, one never keeps this or that particular individual in mind, but the learner in general is thought of, a single person (really oneself), not because thinking is a special attribute of his, but because his thinking represents for us the necessary thought of all other men. Processes which are accomplished in the same manner in all men, processes which follow an invariable sequence, are called objective processes.

'Now in the individual learner the logical processes

are always accompanied by others, the constant attendants on thinking. These are not of a logical kind and do not directly influence the *results* of thinking, but they modify the swiftness and promptness of the thought-processes themselves. They are mental fatigue, practice, feeling-tone, association, memory, imagination (*Vorstellen*), attention. These are the truly psychological processes which always accompany the learner's thinking. For these the second didactic norm claims attention in the teacher's method. As the antithesis of the first or logical norm, this may be called the psychological.

'Its claim to consideration may be set forth in a variety of ways. The psychological processes, like the logical, are effected in the mind of the learner. But while thought obeys the same laws in all men, in general accordance with which universally valid knowledge—*i.e.* Science—is first possible, the psychic processes are variable not only for different persons, but also for one and the same person. For example, memory differs from man to man, and may acquire notable development in an individual; and so of the other processes named. The psychological processes vary with age, sex, person, with external and internal circumstances. Were this the case with thought, science would be in a bad way. It is generally agreed to call whatever so changes, subjective. The term may be applied to these psychological processes. Thus the concept 'subjective' stands as the converse of the concept 'objective,' appropriated to the logical processes. The former expresses the variable, the latter the invariable and permanent.

'Beneath all their differences, the psychic processes possess, each for itself, an especial didactic interest, which changes from person to person and thus characterises the individual. Therefore the teacher, bound to respect the variability of mental processes, must study

accurately the psychic habit of the individual. The psychology of the individual is for him a leading sphere of observation. Strictly, one ought to say, the psychology of the individual *learner*, if the didactic standpoint in question is to be rightly indicated. The battle-cry, Respect the individuality of the pupil! is so frequent upon all lips that little which is of importance on that head remains unsaid. Yet even that little will show how great an abundance of hitherto unrecognised problems lies before us to-day in that quarter. Just as method, so far as it belongs to the first norm, concerns itself with the learner in general, so the second norm principally requires attention to particular mental habit.

Psychological Experiment in Schools.

'For the discovery of logical methods, the point of departure is an inquiry into the methods of research, for these must contain the principles followed in the development of knowledge generally. But for the discovery of appropriate measures in the treatment of the pupil quite another auxiliary is needed, and a reliable one exists in psychological-didactic experiment. As for customary experiences, only such of these can be utilised as approximate to experimental exactness. But we must not be imposed upon by the expression Experimental Didactics. It must not be said that the whole of didactics reposes upon an experimental basis. That is true only so far as purely psychological processes are in question; logical methods are the result of a purely logical investigation concerning the growth of knowledge. It is, therefore, wide of the mark to set forth all didactics as experimental, as Lay has recently done.

'The different claims of the two norms upon the teacher may be still further enunciated. The first or logical norm advances measures for the construction of

new knowledge; the form of all scientific knowledge is the judgment. But the measures contrived by the second or psychological norm do not lead to new knowledge; their end is not a new branch of science. What they produce in the learner's mind is not a judgment, since every judgment results from *logical* method. The teacher's psychological measures simply endeavour to obtain swiftness and promptness of thought or of other processes; their purpose is the greatest economy of energy and of time. Methods, so far as they belong to the logical norm, treat the subject-matter in accordance with its scientific-objective nature. So far as methods belong to the psychological norm, they treat the pupil in accordance with his psychic-subjective nature.'[1]

We cannot follow the author here in his elaboration of the second norm, with its constant and most interesting references to actual experiment in the class-room. Space can only be spared for an enumeration of the topics discussed. Under the head of general conditions of mental work are included the phenomena of practice and of fatigue, the relations of stimulus and weariness, and a consideration of the intellectual atmosphere which is consequent upon the association of many learners in a class. The last is an attempt to secure a measure of accuracy in the notions we attach to the phrase, the 'sympathy of numbers.' Some of Meumann's instructive inquiries are adduced by way of illustration. Under the general heading of Apprehension, the author discusses the Pestalozzian principle of intuition (*Anschauung*), and reduces its scope to juster limits than do some writers. Then follows a section on the excitement and maintenance of attention. Under retention, the different types of memory—visual, auditory, and motor—are considered, and some very practical experi-

[1] *Grundlinien*, pp. 154–7.

ments in learning by heart are described, with a section on the advantages and disadvantages (as a teacher conceives them) of casual associations. A few pages upon practice and the principle of the spontaneous activity of the pupil close one of the most instructive books upon teaching which have appeared for many years past, a book of the first rank in its class.

The position assigned to logic by Messmer in his theory of instruction is noteworthy. His view that a purely psychological method is impossible is shared by another writer, Dr. E. von Sallwürk, who may be mentioned as another severe critic of the Ziller-Herbart school, though not an experimentalist. His book, 'The Normal Form of Didactics,' is a vindication of the claims of logic against an excessive attention to considerations wholly psychological. It has always been a defect in the Herbartians that they have ignored the rehabilitation which has taken place in the study of logic since its revival under John Stuart Mill. It remains for them the dry formality which it was in Herbart's time, and therefore negligible.

E. von Sallwürk.

FOR FURTHER READING.

Books named in previous sections: H. Spencer, *Education*. Dewey, *The School and the Child*. Rein, *Pädagogik im Grundriss* (or the translation by Van Liew). Welton, *Principles of Teaching*. Raymont, *Principles of Education*, Chap. V.

F. Warner, *The Study of Children and their School Training*; and, *The Nervous System of the Child, its Growth and Health in Education*. Both published by Macmillan.

J. J. Findlay, *Principles of Class Teaching*, pp. xxxvi + 442. Macmillan, 1902.

E. L. Thorndike, *Principles oj Teaching based on Psychology*, pp. xii + 293. New York, A. G. Seiler, 1906.

O. Messmer, *Kritik der Lehre von der Unterrichtsmethode*, pp. vii + 180. Teubner, Leipzig, 1905.

O. Messmer, *Grundlinien zur Lehre von den Unterrichtsmethoden*, pp. x + 238. Teubner, Leipzig, 1905.

W. A. Lay, *Experimentelle Didaktik, ihre Grundlegung mit besonderer Rücksicht auf Muskelsinn, Wille u. Tat.* Wiesbaden, Nemnich, 1903.

E. von Sallwürk, *Die didaktischen Normalformen*, 2nd edit. 1904. Frankfurt-a.-M.

A periodical devoted to pedagogical research is *Die experimentelle Pädagogik*, edited by Meumann, and published by Nemnich of Leipzig, 1905, &c. Two vols. annually, at 5 marks each.

Meumann's experiments were published in the *Deutsche Schule*, 1902, &c.

PART II

SPECIAL METHOD

SECTION I

RELIGIOUS INSTRUCTION

THE subject of religious and moral instruction at the present day, whether in homes or schools, is beset with a very large amount of difficulty. This arises partly from the uncertainty of thought on the subject, partly from the intrinsic difficulties, partly from the fact that the question has been involved in political controversy. It would be quite futile to attempt to write on this subject in a way which would satisfy everyone. The only course open which is of any value is for the writer to state clearly and definitely his own opinions, and to leave others to adapt the methods suggested to their own particular position. In the following pages an attempt will be made to sketch religious education as, in the writer's opinion, it ought to be, and to leave to those who make use of them the processes of adapting what is here stated to their own particular needs.

General Principles.

A few words must be said, to begin with, on certain general principles. In the first place it must be clearly stated that religious education, to be of any value, must be denominational. That does not mean, as is generally supposed, that a child's mind must be troubled with the particular points upon which religious com-

munities differ from one another. That is not in the least essential. It is probable that in the majority of the Church schools of this country hardly anything is ever said or taught which would be repugnant to most Nonconformists. What it does mean is that religion, to obtain its full value, must be connected with a definite system of life and worship; that it must give a child not only a certain amount of information about Biblical matters, but a rule of religious life and conduct. This implies a denomination. From the point of view of the State at the present day undenominationalism is a blunder. It is quite right that as regards education the State should be neutral between the different religious bodies. It probably does not matter—or matters very slightly—from the point of view of the temporal well-being of the community, to what religious denomination a child belongs; but it does matter very much whether a child is brought up as a member of a Christian Church with a system of moral and religious instruction which will make him an honest and good citizen. It is not our business here to suggest the way in which the ultimate solution of the 'religious difficulty' may be arrived at. It will be enough to say that if the State were to lay down that in the schools of the country children were to be brought up in the religion of their parents, and to receive the religious instruction which the parents desired, the practical working out of this would be much more simple than is supposed. No doubt it would somewhat detract from that uniformity which is the unfortunate result of systematised education; but every locality would be able to settle its own affairs easily if given freedom. Throughout the controversy on the subject it has been not so much the conflict of religious bodies which has hampered the settlement of the question, as the red tape of officialdom.

One thing more may be said by way of preface. It is quite obvious that no one should be compelled to give religious instruction in which he does not believe. On the other hand, every schoolmaster who has a worthy conception of his work will be anxious to give it. The situation thus created can be met only by a system of freedom. No master ought to be compelled to give religious instruction, but every one ought to be allowed to give it if he desires to do so. As all those who are really fitted to be schoolmasters will be anxious to deal with their children from every point of view, such freedom will naturally lead to the masters seeking to teach in the schools where the religious teaching is in harmony with their own opinions. With these few words of preface we pass on to our subject.

The Teacher's Training.

The first thing we have to consider is the training of the teacher for giving religious instruction, to which we may also add his self-preparation. If a schoolmaster is to be fitted for his work at all, it will depend to a very considerable extent upon his character. In our somewhat elaborate arrangements for fitting an elementary school teacher for his task we sometimes forget that after all what the man is is the important thing. The children whom he teaches will unconsciously be very largely influenced by his character; his capacity in discipline and his training will depend very largely on the same influence. If this be so with regard to secular instruction, it is still more the case with regard to religious instruction. Moral teaching comes with very little effect from anyone who does not attempt to carry out in his own life what he proposes to teach. No one demands the impossible, a child least of all; children have an unconscious way of making allowances for their elders and betters, but they do feel instinctively whether or no the teacher cares for them,

and whether or no he really feels and means what he says. Anyone who is anxious to teach children ought to be quite clear that he is trying earnestly to do himself what he would have them do.

The same is true about religious belief. The teachers must be sincere. There are two dangers to which a teacher is exposed. The one was the fault of the old system, the other is a mistaken view which may very likely arise at the present day. In the old days there was often a narrow and mechanical system of religious instruction; there was great danger of professionalism, of teaching the Church Catechism like anything else, according to a regular routine, without feeling in any way that it was a thing that influenced either the teacher or the taught. At the present day there is, perhaps, a danger of over-scrupulousness—no doubt a fault on the right side, but still one which may hamper the good influence of a good man. The reaction from the over-professionalism of religious instruction in the past has produced the feeling of doubt that certainly exists at present about all religious teaching. If that feeling reaches the point in which a man's own belief is overthrown, of course he must very reluctantly give up attempting to teach children. But in many cases it only means doubt on some smaller points—a state of doubt which may easily be corrected by a little more thought and a little more learning; and no one ought to feel that that need prevent him from quite sincerely and uprightly giving religious instruction to children.

He must be firmly convinced of the reality of God and the human soul; he must believe in Jesus Christ and the revelation through Him; he must be prepared to use the Bible as a record of divine inspiration. But there are many points upon which he will trouble himself, on which it is quite right he should reflect

carefully and thoughtfully, but which will not hamper the sincerity of his teaching.

We pass on now to his intellectual training. The great danger at the present day is that the standard of religious instruction and religious knowledge is in many cases a totally different one from that of every other subject. The unfortunate result of disagreement about religious matters has been that religious instruction is in many cases completely crowded out of the schoolmaster's own education. While on scientific or literary subjects he may be receiving the highest university education, and may know the last results of modern thought, his instruction in religious subjects is very probably entirely non-existent. When he comes back to teach in schools he may find that his knowledge of the Bible is no greater and no more scientific than it was when he was at school himself. Moreover, at many of the training colleges where religious instruction is given it is entirely inadequate and unenlightened. On the one side the subject is crowded out by the pressure of Government examinations and inspections, on the other side it is hampered by a timid conservatism. It is this timid conservatism that does a great deal to break down the religious belief of the future teacher. If he is told that he must authoritatively accept views of the Bible, and of subjects connected with the Bible, which are clearly inconsistent with everything else that he learns, either in his scientific knowledge or in his literary training, he will naturally find belief very difficult. Or if, having had his mental capacity developed so as to think and apply critical methods to other books, he then finds that the Bible is treated by many eminent modern scholars according to those methods, and he is told that to accept such methods is wrong, he will not unnaturally be inclined to give up his belief. A great deal of the scepticism of the day

comes from the fact that the religious training of the teacher is on an entirely different level of thought from that of his other subjects. It is necessary, then, that a teacher should be trained for his work in religious knowledge as in other subjects, and that that training should be scientific. This does not mean of course that he need be expected to give instruction in the higher criticism to the lower 'standards' of an elementary school, but it does mean that he must know a sufficient amount on such subjects not to teach children what is almost certainly untrue. He must shape his religious instruction in accordance with full knowledge, just as he shapes his scientific instruction in accordance with full knowledge. In neither case does he necessarily instruct his children in the way that he has learnt himself; he prepares them for it.

The Teacher's Knowledge.

What, then, ought our teacher to know? He must have some knowledge of the modern scientific treatment of the Old Testament. This means that he must know the main results of the literary analysis of the different books. He must know the limits of historical accuracy, and he must be acquainted with the reconstruction of Christian teaching on that basis. It is not in the least true to say that the value of the Old Testament is gone. Some people in a feeling of panic seem to think so. Whether from the point of view of the teaching of mankind, or from that of its witness to the divine element in human life, the value of the Old Testament remains supreme. It alone taught the ancient world, as it teaches us, of the one God, exalted in righteousness; it puts before us a strong, robust moral life; it makes us realise the long process of the preparation of the world for the coming of Christ. It prepared the way for and witnessed to the Christ that was to come. It is true that the old system of types and Messianic

prophecy would not be applied in the present day exactly as our forefathers applied it; but it is true all the same that there is a continuous expectation of the destiny of Israel to be fulfilled in the coming of Him who was called the Messiah, the growth of which can be traced throughout all the history of the Jewish people. An acquaintance with the modern way of approaching the Old Testament does not mean a very large amount of new knowledge, but rather the acquisition of a new aspect of thought, which need not mean a burdensome task. It may be suggested that a careful study of such books as Dr. Driver's 'Genesis' or 'Isaiah,' or Dr. Adam Smith's book on 'Isaiah' will really be sufficient. Dr. Driver's 'Introduction to the Old Testament' may be useful for the purposes of reference, but it is not necessary to have mastered the whole of it. Another useful book is Dr. Sanday's 'Bampton Lectures on Inspiration.' Parts of it are somewhat technical, but many chapters will be full of assistance to a thoughtful reader in forming his opinion of the morality and value of the Old Testament. The important thing is to have grasped the changed attitude.

The second point in training in regard to the Old Testament is of course to recognise the wealth of interest, especially for the boys in secondary schools, which may be gained from a knowledge of the ancient history of the world. It is less necessary to speak about this as many books have been written to enable the results of the study of Assyrian and Egyptian history to be acquired. Of course a schoolmaster will have to be learning, if he is doing his work properly, the whole of his life. What is necessary is that during his period of training he should become acquainted with the writings which will give vividness and life and illustration to his teaching about the life of the Old Testament.

When we pass to the New Testament the problem

is less difficult, and the attitude to be adopted has not changed to the same extent. It is a good thing that the future teacher should have some acquaintance with the criticism of the New Testament, and should learn both the extent of our certainty and the limit of our uncertainty with regard to it. It is of course a good thing if he has learned to read his Greek Testament, and can thus know the more accurate interpretation of the words of the Gospel; but the greater part of it will not present the same serious difficulties as the Old Testament. Whatever view we may take of the authorship of the fourth Gospel, for example, the great bulk of New Testament teaching is unaffected by it. The attitude, therefore, has not changed very much. The opportunities, however, of acquiring knowledge are very great. From the point of view of the schoolboy, especially the boy in the classical school, the work that has been done by way of illustrating the Acts of the Apostles and St. Paul's travels from archæological and historical research is of the very greatest interest. The works of Sir William Ramsay on St. Paul will add a freshness and life to any teaching on the subject. The present writer remembers with what intense interest, in his schoolboy days, he used to read books like 'Conybeare and Howson,' on the life and travels of St. Paul.

So far we have only considered Biblical knowledge. In some ways this is the most important, because in many schools at the present time that is all the religious instruction which is given. It has already been clearly stated how inadequate, from the point of view of the present writer, such instruction is; but if it is to be given it must be given well. It is inadequate, but it is not useless or valueless, and if a master can train up his boys in a sound knowledge of the Old and New Testaments, and give them such information about modern

discoveries and modern points of view as to save them from the shock of later discovery, he will have performed very good work.

There are, however, two other subjects in which the teacher at any rate must train himself. The one is Christian doctrine, the other is Christian morality and life. As regards Christian doctrine, the important thing is that he should clearly make up his mind on the central fact of Christianity. He ought to have read enough to know whether he really believes in the Incarnation. If he does, all the rest of his teaching will arise naturally out of it. If he does not, it is better that he should not give religious instruction. It is not of course necessary that he should have the acquaintance of a technical theologian with Christian dogma; what is essential is, that he should be able to give for himself a straightforward answer to the question: 'What think ye of Christ? Whose son is He?' Some such book as Dr. Gore's 'Bampton Lecture on the Incarnation' may be in particular recommended. There are certain broad lines in regard to the belief in our Lord which may be laid down. There is a long and continuous preparation in the ancient world, whether in the Jewish race or among the Gentiles; there is the firm belief in the coming of the Messiah wonderfully fulfilled in the coming of Jesus the Christ; there is the tremendous transformation in life and thought and teaching, compared with anything which had preceded it, which may be seen in a work like the Epistle to the Corinthians; there is the witness to Christ in the growth of Christianity, in the transformation of the Apostles' minds, in the victory of Christianity over the Empire, in the existence at the present day of the Christian Church. All these facts he should grasp, and in order to give religious instruction well he must have had sufficient knowledge to realise their importance.

The Teacher's Morality.

The second point that we have to consider is the moral preparation of the teacher. He will probably, nowadays, as part of his professional training, learn something about psychology and something about ethics, and, so far as it goes, that is satisfactory; but just as philosophy by itself will very rarely give a useful creed for life, so ethics by itself will very rarely give a useful rule of conduct. The future schoolmaster has to learn to fashion his life in the right way, and he is exposed by the very nature of his calling to a very great danger, that of looking at it merely from the disciplinarian point of view. I am referring, of course, now to those who are anxious to do right. He is exposed, as we all are, to the dangers of selfishness and of self-seeking—both of them very natural failings with men whose whole interest has been necessarily centred on their own career; men who have had to win a place for themselves by a system of examination, and have, perhaps, been cut off from the healthy discipline of their home life by being taken into another sphere of training and thought. Their main interest has been in their career, and there is, therefore, for them the danger of an exaggerated self-interest, which may become selfishness. There are also some developments of the teaching profession in the present time which must create considerable misgivings. Then there is the danger of indifference to conduct. The interest may become—and our system of training has a tendency to make it become—purely intellectual. Probably every clever boy or young man goes through this stage, and there is a particular danger of this in the large class from which elementary school teachers are drawn. They may have lost largely the influence of home in the isolation of their school and college training, and, unfortunately, in so many of the newer schools and colleges

there is not the strong *esprit de corps* and wide-minded humanism which unconsciously modifies the thought even of the clever boy at a public school.

But supposing a schoolmaster is keenly interested in moral questions, there is the danger of his approaching morality too much from the point of view of the disciplinarian. A child, of course, must be taught that some things are right and some are wrong—he must be educated by means of a code; but it is essential that his teacher should realise that no satisfactory morality can be built on a code, that it must always be based upon principles. It is no good sending a child into the world with an idea merely that certain things are right and certain things are wrong. Of course, a very large number of things which are wrong in the child may be quite right to the man, and therefore the boy finds himself, when he gets older, with no other standard of conduct than public opinion and conventional morality. It is necessary that he should have moral principles as well as moral discipline, and his teacher must have them first. The teacher must have passed from the morality of the Old Testament to the morality of the Sermon on the Mount. He must have in his mind great ideals of purity, of unselfishness, of self-restraint; and he must have learnt to sum up his moral teaching in the two great truths, the love of God and love of man; and throughout he must always be trying to correct the austerity of too hard a morality by that element of humanism which Greek thought has contributed to modern life. All great ideals are made up of combinations of apparently opposite qualities, and the Christian life in its highest form is a combination of the old Jewish ideal of righteousness and the Greek ideal of the harmonious and perfect development of all the different human endowments, the two merged in the great Christian virtue of love.

The Unifying Influences.

We have tried in the above pages to sketch an ideal of the teacher's training, such as will fit him for the work of himself bringing up boys and girls to be good Christians and good citizens. The unifying influence in education must be the teacher's principles and character. From one point of view all religious teaching often seems strangely scrappy. Books of the Bible read, passages learnt by heart, some explanation of the Prayer-book, the Church Catechism, a certain number of hymns—those must always be the main bases of the religious training. Taken by themselves they are, as we have said, very scrappy; some bits of ancient history, a certain number of old collects and prayers, a Catechism somewhat archaic in its language, bits of ancient Hebrew or of early Christian life, of the history of the sixteenth and seventeenth centuries. How can these make an impression upon a boy—upon a growing child? They cannot, unless they are unified in the mind of the teacher. He must have a sound grasp of the unity of history to feel the force and power of the old Hebrew life and its influence on the world. He must realise the Incarnation as the unifying principle in history, in morality, and in thought. He must have built up his own conduct in the Christian ideal, and he must realise the importance of the traditional English Christianity as enshrined in the Prayer-book and our popular religious poetry as a great formative element in the English life. If the teacher unifies these things in his mind as religious instruction, his pupils will do so as well.

We now pass from the training of the teacher to the lessons that he teaches, and we will begin with the elementary school. The teaching in all elementary schools should consist, first, of a sound knowledge of the Bible; secondly, of the catechism, as giving a

system of religious thought and conduct; thirdly, of the Prayer-book and hymns, so as to bring up children with a capacity of benefiting themselves from religious worship and taking their proper place in it; fourthly, of the general impressions of morality and conduct which come to the child from the discipline of the school, from all his various readings and the influence of his master. Here the element of personal character comes in very strongly. We will take the first three headings in order.

1. The Elementary School.

The Bible.

As regards the Bible, there are in many places admirable syllabuses adapted to the capacity of children in each stage, and calculated if rightly used to give a very considerable knowledge of the Old and New Testaments. They begin with simple stories of the Gospel narrative and of the Old Testament, taught in the infant classes by means of pictures. They pass on gradually to the complete knowledge of the Gospel narrative and to the general course of Jewish history. Side by side with these regular courses there is the study of special texts, of passages which children learn by heart. The whole ought to be an admirable training; it seems often to fail to be so. A large number of children pass away from school with very little impression of any of their teaching. The tendency nowadays, in the majority of schools, as far as one can judge, is for the religious teaching to leave less influence than any other teaching. There are, of course, exceptions. In some schools, 'provided' and 'non-provided' alike, a boy or girl at the age of twelve or thirteen has a really good knowledge, for that age, of the Bible. But even in these favourable circumstances, the pupil probably has not the very deep interest which will make a clever boy wish to continue his studies.

What element ought to be introduced into the teaching to make it successful? In the first place a strong historical interest ought to be created. It seems to be forgotten nowadays of what tremendous value, from the point of view of the study of real history, the Bible is. The object of education has been defined as the attempt to make the past, the remote, the unseen more real than the immediate and present; to train a boy to take a wide view of things. We want to imbue him with the history, the literature, the thought of times different from his own, and so we teach him history; and history, to be good, to be useful, should be not merely the reading of a text book, a number of names and of dates, but an acquaintance with original sources. The English schoolboy from his earliest years can learn the history of one of the most interesting and most profoundly important races of the world in its original sources. To a boy or master with any imagination the history of Israel is of the profoundest interest. But modern discovery has made it even more interesting. Every school should illustrate that history by pictures of archæological discovery. Children are very quick to pick up things put to them in the right way. But in many places this is never done. We remember ourselves talking to the children in a school where they really had learnt a great deal about their Bible, and after careful investigation we discovered that they had not the slightest idea whether Saul of Tarsus, or Saul of Benjamin was the earlier; whether David lived before or after our Lord; they had never realised that Palestine was a place; nothing had been done to try to give them an idea of the sequence of events in historical chronology. They had simply learnt a number of isolated stories, some of them interesting; but nothing had been done to give them the idea of history from the

The Historical Interest.

Old or the New Testament. What a tremendous opportunity of education is here missed !

Then, secondly, the teaching of the Old and New Testaments should be inspired by a conception of the religious purpose. This is only possible if the teacher himself has a sound grasp of what it means. He must realise the New Testament as the record of a Divine revelation, the Old Testament as the record of a long process in history, preparing for that revelation. If he has those two conceptions in his mind he will both teach children what they ought to know and prevent them from learning what they ought not. He will prevent them from going away with distorted ideas arising from the imperfect morality of the Old Testament. He will, for example, point out in the character of David all that was great and heroic—and there is no character in history which can teach that better than David—and will make his story a basis of instruction in the duty of patriotism, while he brings home the disasters which arose from the imperfect morality of the times. Throughout he can remind his classes that the moral principles of that time were inadequate, because Jesus had not yet come into the world and taught men better things. He can prevent a boy from going away with the idea either that the treatment of the Amalekites should be a model for our dealings with inferior races, or that the Old Testament is untrue because the morality was inferior. All this is possible if the teacher has once grasped the right position for himself.

The Religious Purpose.

And then, arising out of this, he must teach the Bible and especially the Old Testament so that the clever boy as he grows up will not need to unlearn what he has already learnt. How is this to be done ? We have said that children do not need to learn the higher criticism. That is true ; they want to learn the Bible,

not the criticism of the Bible, but they want to learn it in a way that will not conflict with modern knowledge. Do not let our children in one hour learn that the world was made in six days, and in the next hour go to a geological class and learn that it took millions of years for its formation. Do not teach that the story of Adam and Eve is historical, and then leave them at the age of fifteen to begin to have religious doubts because they do not know who was the wife of Cain. All this is quite unnecessary. The child learns quite early in his life what the meaning of a parable is. He is quite ready to tell us, in a phrase consecrated by many generations of teachers, that the parable is an earthly story with heavenly meaning. He knows that the earthly story need not be any more 'true' than many a fairy tale which he is told, and that the heavenly meaning is what is true. Why should not he be told exactly the same thing about many of the stories of the Old Testament? We none of us accept a cosmogony which limits the work of creation to six days, and the earliest human creatures to a single pair of individuals; we no longer believe that the Flood happened in the way that was once supposed. To what extent the histories of Abraham, of Isaac, and of Jacob can be regarded as mere bald matter of fact is now recognised to be a difficult question. We know that a great deal was ascribed to Moses which he did not do. Why should a child be taught these things apart from the light of our present knowledge, only to unlearn them later, perhaps with disastrous consequences? Surely it is not necessary that the truth of Christianity should be made to depend upon historical facts which are to say the least doubtful.

On the other hand, why should the child be deprived of reading the most beautiful and suitable of the stories that we learnt in childhood—stories which

are still quite capable of being taught and used in a proper way—for fear he should learn what is untrue? Some modern syllabuses leave out parts of the book of Genesis. All this is surely a mistake. Let the child learn naturally and simply that the Old Testament, like the New, contains parables, and let him learn quite naturally as he grows up that the Bible was given to teach us religion and not science. Let him learn quite naturally, without ever having learnt anything else, that the people who wrote the Old Testament made mistakes in history, and so on, and that we have the record given by human hands of God's teaching the world. If the teacher has once grasped this he can teach the children easily and simply.

We do not think it necessary to work out in greater detail what the teaching of the Bible should be in its first stage. The whole essence lies in the right principles being grasped. The Bible instruction may be the most important and the most inspiring of the work that the children do, or it may be the most futile and the most useless. All will depend on the proper attitude and, to a certain extent, on the proper training of the teacher.

The Catechism.

Let us pass on now to the definite religious instruction which for most children is contained in the Church Catechism. Here, again, we may have teaching which is dead, or the strong basis of a sound religious faith, and all will depend on the attitude of the teacher. To begin with, are we to have a catechism? My own answer would be most assuredly, Yes. No doubt catechisms have been taught in a thoroughly ineffective way in the past, and there is a revolt against such teaching. The child nowadays has never to learn anything which he cannot understand. He is gradually to be led on from what he knows to what he does not know. That this element should come into teaching,

and should be present always in the mind of the teacher, we quite admit; but we are equally certain that the child should learn a great deal which it will take him all his life to understand. If all his teaching is adapted to his childish intelligence he will have nothing to fall back upon later in life. The poetry that he learns should be, a great deal of it, far above his head. He will come back to his Bible in after years and find how different it was from what he thought it. His catechism will contain, he finds, a great deal which, as years go on, he can expand into a philosophy of life and thought.

And, then, are we to have our old English Catechism, or some new up-to-date document? Again, the present writer has no hesitation in saying, Keep the old Catechism. No doubt, it requires some interpretation; no doubt it is not what we should produce at the present time; no doubt, it is not all understood; but, all the same, it is linked with the historical traditions of English Christianity and of the Church as a whole. The child who has learnt it will have the opportunity of building up his life on the two great bases of faith and duty. Have we ever considered the immense influence which has been exercised by the two catechisms of Scotland and England? The Shorter Catechism has made the Scotch people a metaphysical race; the English Catechism has built up generation after generation of Englishmen with a great ideal of duty. It contains hardly a word that the great majority of Nonconformists need object to. It has probably produced as many God-fearing Nonconformists as it has Churchmen, and it has a dignity in its language which will be a wholesome corrective to modern representations of religion. But, again, all will depend on the way in which it is taught; and the way in which it is taught must depend upon the way in which the teacher has grasped it. We do not want conventional

'Scripture proofs,' but we want the teacher to realise, and to make his children realise, how the English Catechism reproduces the spirit of the Bible. The child learns the Commandments, he learns his 'Duties,' and side by side with them he can learn the Sermon on the Mount and the great Christian commandment of love. It is hardly necessary to go into greater detail; that is not our function at present. No doubt, books with notes on the Catechism are useful to the teacher, but do not let us have an excessive formularism introduced into our religious instruction. Let the child by all means learn his Catechism—let him learn it by heart and gradually master its meaning; but do not let us have another little catechism as an expansion of the Catechism added to it, as is so often the case. Let him learn the Catechism, and then let him be taught about it, and about his Bible, with all the intelligence, and all the interest, and all the enthusiasm which the best modern teaching can inspire.

Prayer-book and Hymns.

Our third heading is the Prayer-book and hymns. Here we pass to what is more definitely connected with the Church of England and with English history, and it is less possible to suggest that those who are not going to worship according to the Church of England may like the instruction. Notwithstanding the close association of some Nonconformist bodies in the past with the Book of Common Prayer, the book must here be considered mainly from the point of view of the Church of England. It is connected with the formative period of the English Church; the hymns represent popular religious aspirations. From childhood onwards the two together will form a healthy manual of religious life. But, again, why should either of them be divorced from their history? The child probably learns in school about Henry VIII. and

Edward VI., Cranmer and Queen Elizabeth. Why should not he, to begin with, have his Prayer-book connected with those names that he learns in his secular history? Why should not he learn that men and women in his own country were connected with religious history? If the teacher knows these things he can tell them and create interest. Of course, there is also something very practical to teach about the Book of Common Prayer. There is probably no service more satisfactory to one who is trained to appreciate it than this sober and dignified liturgy of the Church of England; but for most people at the present day a training is necessary to make them care for it. The language of the Prayer-book is not the language that we speak. It appeals to an educated man, but is meaningless to the uneducated. You cannot expect a person to care for it unless he has been trained to like it. Many a young man nowadays cannot find his way about in church; he does not understand what is going on if he comes in casually. It is essential that children, if they are to get any good in after life from the English service, shall be trained in the use of the Prayer-book. It is essential, too, that they should learn to understand its language. There is often a great difference between the esoteric and exoteric aspect of a service. A well-trained English Churchman feels that his service corresponds to his religious needs; he loves the familiar rhythm of the words; he can express himself through them; they appeal to his religious sentiment. What is old-fashioned or uncouth he learns to set on one side. The outsider comes in and the whole thing seems meaningless and dreary. We believe that from every point of view, religious and moral, the sober liturgical worship of our Church is better than extempore prayer or the emotionalism of revival meetings. But, except for those carefully trained in it, it is almost

as meaningless as the Roman Mass is to an outsider; therefore a child must be carefully taught about his Prayer-book. Then, of course, his religious sentiments may be stirred by the wealth of popular hymns which he will learn at school.

And there is just one more point we might add. Cannot we build up a popular and traditional Church music which every child may learn, and the whole congregation may know? The school ought to work side by side with the rational reformer of church music, to make our religious services really reflect people's thoughts.

In the foregoing sketch we have written definitely from the point of view of a Churchman. We do not believe that any religious instruction is really satisfactory which is not connected with a definite religious society. We should be glad to have the same elaboration of method for Nonconformity. We should be glad that they should have exactly the same opportunities and facilities in every school for their own children that we desire for ours. We do not believe that unity in these matters can come through indifferentism or undenominationalism. It may, however, be convenient to point out that nothing that we have said on the subject of the Old and New Testaments need necessarily be associated with the Church of England teaching. It might form the basis of Biblical instruction in every school in the kingdom. We do not think that it is in any way complete, but it represents a training which will be, as far as it goes, of the very greatest value.

II. The Secondary School.

We have to consider now the second stage in religious teaching, which coincides approximately with the time spent at the secondary school, extending from the years twelve or fourteen to sixteen or eighteen. The decisive point in this period is that in the Church of England it includes the time when the ordinary boy or

girl is prepared and presented for confirmation. In most of the public schools of the country confirmation is held at the school, the preparation is very largely in the hands of the head-master, in some cases of a chaplain or special clerical master. In some schools this preparation is probably done very well; in others in an extremely perfunctory way. In some day schools, also, preparation for confirmation is carried on at the school, and for many reasons it is very desirable that it should be, whether it be in the hands of the head-master and his assistants or of a clergyman from outside. The ordinary parochial confirmation classes outside the school will be largely for a different type of boy. The

Confirmation.

advantage of a school confirmation is that a higher standard of intellectual and literary knowledge can be expected in a candidate. If the confirmation does take place at the school, it is of the very greatest importance that the preparation should be thoroughly well done. There is no time of life, probably, when boys are so impressionable; it is almost the only opportunity for direct, personal, individual contact with a boy's religious and moral life; there is no time when a boy needs help more. The official and recognised character of the confirmation gives an opportunity which no other occasion will ever give for the plainest and most direct advice upon the conduct of life, and, besides religious teaching, upon moral questions. It is the opportunity when a definite and conscious philosophy of life can be first taught a boy, and when the kind of religious difficulties to which he is exposed may be approached. The preparation ought to be out of school hours; it ought, of course, to be voluntary—that is, only for those boys or girls whose parents desire it; but the connection with school enables the work to be thorough, systematic, and intelligent. As the subject is perhaps outside our task,

and touches other spheres besides that of direct education, it may be considered that we have said enough about it.

Now to pass to definite religious instruction, and, first of all, Biblical teaching. In secondary schools the

Biblical Teaching as Culture.

boys will be of two classes—those whose training is classical, and those whose training is modern or scientific. For each class, but for different reasons, the study of the Bible is of very great importance as part of their general education. To the classical boy the Greek Testament is by inheritance a natural part of his training. There is no reason why it should not continue so, only the masters ought to be properly trained to give the instruction, and not look upon it as an inferior classical lesson. For every boy who is reading ancient history the Old and New Testaments fit directly into his studies. They are original documents of the very greatest importance; they can be correlated with the whole of the work. The Acts of the Apostles, for example, teems with allusions to the political conditions of the time; it can be made a centre for the most interesting archæological work. The Book of Isaiah is profoundly interesting reading side by side with Herodotus, presenting, as it does, the kingdoms of the ancient world from a very different and very illuminative point of view. There is a basis, then, for making Biblical training full of interest to the able schoolboy, and there is great value in many ways in approaching the subject indirectly. The present writer remembers the intense interest with which he first began the study of one of St. Paul's Epistles in Bishop Lightfoot's 'Commentary.' It made a most profound impression upon him, which has lasted through life; and there are many other schoolboys who could say the same thing

For our second class of schoolboy the study of the Bible is equally important as a branch of culture, but for a very different reason. It is probably the only opportunity that there will be to introduce him to the life of a world of thought very different from his own, and to a literature of surpassing excellence. That there must be a section of society who, both by their tastes and for the needs of their country, must have a training mainly scientific, is undoubted. They will have to receive their culture in quite a different way from that in which the classical student gets his, in a way which, to a very large extent, may be a very good one. Their training ought to be on the great masterpieces of English literature, on the writings of English thinkers, political, ethical, philosophical, and on the Bible. In that way, while the bulk of their time is devoted to their scientific training, they may receive a culture which will be of the greatest value to them in future life. It is a most unfortunate thing that probably at the present day in most of our schools there is no teaching more inadequate than that of English literature, or than that of the Bible.

We would suggest, then, that a systematic training in the English Bible should be looked upon as an essential part of the training of every secondary school, that this training should be primarily historical and literary; that it should be always in the hands of those to whom the Bible is a religious book, and who will treat it, both in their teaching and in their own thoughts, with that reverence which is the right inheritance of Englishmen. Here in many schools, unfortunately, the teaching must stop. If the boys from the school are confirmed it will be in that way that the master will be able to help them in building up for themselves a rule of life and conduct. In other cases he will have to do it indirectly, through the Bible lesson or through his own personal influence. We do not want boys

trained in any particular school of thought, we do not want them sent out into the world with a narrow circle of fixed ideas; but we want them trained to care for the things of the spirit rather than the things of the flesh; to have a high sense of duty and honour; to be pure, unselfish, reverent in tone. They will be helped to become so by the healthy, moral, and spiritual influence of their teachers.

But in definitely Church schools we think that a definitely Church tone should be given to the teaching.

Church History.

This should be, however, not so much by formal dogmatic instruction as by the character of the Biblical teaching and by approaching such questions from the historical point of view. Church history, including some knowledge of the Prayer-book, ought to be taught; it ought not to be taught as isolated from the general current of English history, but the English history should be expanded so as to bring in the whole religious life and history of the country. If in a school the teaching of English history is good, if that history includes a knowledge of the work of the Church from the days of St. Augustine and Theodore to the present time, if it includes acquaintance with the great names in Church history and with the different stages and building up of the worship and life of the Church, if to that there is added a knowledge at first hand of some of the great English writers, a boy will go away from his school, even if his training be mainly scientific, with the material for a healthy development of life. Let it be remembered in all these cases that what we require is not completeness, but that some particular work or period should be well done. Nothing is more disastrous than thinking that in most subjects the school teaching should be such as to take away all the charm of novelty from future reading. There is no need for a boy to have any acquaintance with the great

bulk of the pages of Shakespeare; he has the whole of his life to read it. Let him read one or two plays, and read them well, and be taught to know them; then he may very likely turn in later life to other plays. We very much doubt whether it could be considered necessary to require a boy to read through the whole of the Bible. Let him learn some portions well, so as to feel their interest, and he will be more likely to find freshness in the Bible as a whole in later life.

The Universities.

We have sketched rather in broad outline than in detail the main lines on which religious education ought to proceed. We will conclude by emphasising two points. In the first place, the essential thing is to train the character of the teacher. That will imply an opportunity for everyone at the university to make himself acquainted with theological instruction on the same plane as his other work. We have made the mistake all through our education of beginning to organise it from below instead of from above. We have not developed universities as we ought, and we have not developed teaching at all harmoniously in connection with all the needs of modern life. The old Oxford plan of compulsory Articles and compulsory Greek Testament, or the Cambridge plan of the compulsory 'Paley,' has proved disastrous because the work has been accompanied by the very worst type of pass examination. There is nothing more criminal and more disastrous in the history of religious education than the failure of the clerical teachers and examiners at Oxford and Cambridge to make use of the opportunities which they had. That system has failed, not so much because it was a bad system, as because it was badly carried out; and an alternative system must be developed. For an ordinary arts or science student who is going to be a teacher such an alternative lies in the possibility of obtaining voluntarily a diploma of religious know-

ledge, such as may guarantee that he has studied in an adequate and intelligent manner some portions of the Old or New Testament, and perhaps some side of the philosophical basis of religion. Here, again, selection is everything, for he can supplement his reading throughout his life. Such a diploma has, we believe, already been started at the University of Manchester, and should become general.

Religious Communion.

The second point we would emphasise as we have emphasised it before. We have approached the subject frankly from our own point of view, that of the Church of England. We do not believe that religious teaching will have its higher value apart from religious life. Probably, with regard to the great bulk of religious instruction given to children, there is no substantial difference between the Church and Nonconformity; but there is a difference when it comes to the building up of the religious life of the boy or girl, and we are firmly convinced, from the point of view of the well-being of the nation, that everyone as he grows up should learn to express his religious feelings and to find a response to his highest aspirations in the definite religious life of a properly organised religious community. What we have sketched of the Church of England we should be glad to see others sketch for different religious bodies. We believe that the ultimate solution of the religious difficulty must come, not through undenominationalism, but through a loyal and tolerant denominationalism. A good Churchman and a good Wesleyan are much more likely to combine together to create a united Church than people who are brought up in indifference to religious life altogether, and we would aim at encouraging in school life generally the ideal of religious life coupled with religious liberty and tolerance. Practical organisation of religious teaching will not be difficult if once the principles are understood.

SECTION II

THE MOTHER-TONGUE

Of all the avenues which lead to humanist culture, the broadest and the most direct is the vernacular tongue which boasts a literature. It is the speech which is most frequently upon his lips that determines, so far as language goes, the mental development of the child. No other stands in so intimate or sympathetic a relationship to him : he grows to use its forms with a readiness which might almost be called instinctive, and it is not easy to convince him that his mother-tongue presents to foreigners difficulties which are considerable in number and real in character. Nor is it to words and phrases alone that this feeling of intimacy is confined ; the very sounds of which these are composed have their characteristic ring, English or German or French, as the case may be.

On that account literature makes its closest and most insistent appeal in the mother-tongue, through which the moral and æsthetic attributes of humanism most easily become educational forces. For the English child, the English language is a potent agent of mental development, a means of fostering taste, of acquiring ideas and of expressing them. It is one of the strongest ties which bind him to his fellows, and in English literature he has the clearest available picture of human intercourse outside his own direct experience.

It would therefore seem reasonable to assign a considerable place in the English school course to the

study of the English language and literature, not merely in primary schools or in elementary and preparatory classes, but also in schools of all kinds and throughout each kind. Aims, methods, and materials will of course differ; but the main divisions of the study (speech, written language, grammar, and literature) require attention from all.

Earliest Instruction.

These divisions, however, will not be insisted upon at the outset. On the contrary, the earliest stage which the school can include within its purview will be one which has its literary no less than its linguistic aspect.

1. Speech.

Speech, in the sense of the production of vocal sounds, necessarily lies at the base of any study of the mother-tongue, whether as language or as literature. Being the satisfaction of an early instinct, and the exercise of a habit which is largely acquired within the first three years of life, it is primarily a matter for the home, something to be gained before schooling begins. Yet the child who is learning to talk needs much careful attention, and owing to a variety of causes the schoolmaster knows that he cannot in all cases depend upon the home to make his pupils speak an English which is produced clearly and with purity of pronunciation.

Defects of speech are much more usually due to careless habits than to malformation of organs, though the latter is often alleged as the reason why particular boys or girls fail to produce certain consonants normally. Probably most languages include within their range some difficult and characteristic sounds, and the trick of using the vocal organs to produce these has to be learned, just as the production of all vocal sounds must be learned, but these with greater pains. Failure in them gives a 'baby-language,' which some parents and nurses

begin by admiring for its quaintness, then neglect to correct, and finally accept as caused by defective organs. A somewhat similar neglect is responsible for a good many cases of stammering.

To enforce deliberation of utterance is the first step with some stutterers and those who fail to form certain consonants; deliberation proves to these that they *can* utter the sounds correctly or speak fluently, and confidence follows the knowledge. Their faults must be dealt with persistently, however casual the treatment may be, and it can scarcely be otherwise in the ordinary school-room.

The more general vocal defects, as dropping of final consonants, clipping of syllables, impure vowels, require more systematic handling, which centres best around lessons in the art of reading. All lessons which aim at the art of reading aloud begin appropriately with breathing exercises, mouth-movements, and the repetition of words which are difficult to utter. The use of phonetic aids is becoming familiar in English schoolrooms in connection with the teaching of foreign tongues; not so common is their employment in the teaching of the native speech. It is the practice in German elementary schools to pay careful attention to voice production. The children are directed to note the movements of lips, teeth, and mouth made in speech by themselves or their teachers; diagrams or ingenious combinations of diagram and picture, called 'Lauttafeln,' render their observations easier, and to these diagrams cases of careless enunciation or of wrong pronunciation are referred. These exercises are of course more effective where the language employs a phonetic spelling.

A child's stock of words grows with his knowledge and taste. The more systematic and direct essays to extend and make precise the pupil's vocabulary will

be made chiefly in the lower forms; amongst older pupils they will be less things apart than constant accompaniments of all sorts of intellectual occupation. The method followed by the mother when teaching her child to speak gives the norm for instruction of this kind. Name and thing named are invariably associated in the child's experience; if the actual thing is not there for the child's observation when he first hears the word, it is represented by picture, diagram, model, or the like. The same principle governs procedure at later stages; a word is introduced when it is needed, or at least when appropriate as synonym or as general term.

Vocabulary.

Thus, new words will come before these younger pupils not only by way of books, but also in the gradual modification of the teacher's speech as circumstances suggest. Some teachers of young children keep a list of words to be introduced as occasion serves; in any case, a word which has once been brought to the pupils' notice should be made to recur again till it is worked into their vocabulary.

It is convenient to speak of single words and of exercises upon them; but it is not meant that these are to be treated apart from their indispensable setting in sentence and phrase. They find their natural place in the earliest lessons upon 'Composition.'

2. Oral Composition.

No more gratifying change in respect of method has come about within recent years than the general recognition of the necessity of an oral stage in the teaching of this subject precedent to the use of pen and ink. Composition is at bottom the orderly expression of ideas; given ideas, their partial but intelligible statement by children is not an excessive requirement. Postponement till the art of writing is attained involves loss of time and opportunity which can with difficulty

be made up, while practice and teaching in the use of spoken language are seriously curtailed.

'Composition' is not merely a 'subject' with its set hours in the time-table: it is also an art which may be—indeed, should be—exercised in connexion with most other 'subjects.' Thus, almost any lesson may commence with an oral summary or summaries by the pupils of what was learned in the preceding lesson upon the same topic, or such summaries may conclude a lesson. By devices of this kind 'composition' and the necessary repetition of matter learned are secured at a stroke. Much greater use might be made of the blackboard by the pupils than is usually the case; some at least of the demonstrations which the teacher is wont to execute upon that useful piece of apparatus might be entrusted to the pupils.

But oral composition cannot be left to merely casual opportunities. Set lessons are also needed in which the teacher's chief part consists in making the pupils talk, and in noting for future amendment the manner in which they talk. The first rule of such exercises must be that the subject-matter is familiar. Children may 'tell their thoughts' (that is, frame propositions) about common things, beginning with such as lie about them in the class-room, and passing to objects of everyday experience out of doors. Less formally, they may tell a familiar nursery tale, or repeat the story which their teacher has already told them but not *read* to them.

'Reading a picture' is an especially useful device for 'making talk.' A picture, preferably one portraying movement or one whose subject lends itself readily to narrative, is placed before the class, and the children are called on in turn to describe what is before them. The success of the exercise largely depends on the choice of the picture; clearly such pictures as would tax the

imagination and descriptive powers of senior pupils or of adults ought not to be chosen for this purpose, as a rule, though their occasional introduction to a class already expert in the practice is defensible. Nor should any vague notion of 'training the observation' be allowed to intrude itself, with a consequent spoiling of the linguistic intention of the lesson.

But oral compositions need not stop short at reproduction or description; a picture may be made the starting-point for invention, as when the exercise suggested is an account of what happened immediately before or after the scene depicted. Children may also be invited to add an episode or a 'chapter' to a story already told them; or they may be encouraged to 'make up' a story themselves. Remembering that the purpose in view is the humble one of getting children to talk fluently and then rising to the higher level of talking grammatically, no one need be disconcerted by the literary poverty of the productions. On the other hand, the first stirrings of artistic appreciation may well accompany the attempts of this or that pupil to express himself.

These oral exercises have the great advantage of being readily open to correction; the blunder can be righted as soon as made and its occurrence noted by the teacher. This should be done systematically, a list of the common errors in the speech of the class being kept so that these errors may be taken in hand for cure before much attention is given to mistakes of infrequent occurrence.

3. Literature.

In the lower forms, emphasis upon the division of the school course into 'subjects' easily becomes a danger; if instruction is adapted to the child's own mental processes, it will not stray far from the philosophic conception of the unity of knowledge. Where this is the case, language,

literature, and history will mingle as readily in the teaching as they do in the child's mind. Ancient tradition marks out and consecrates the appropriate agent, which is 'story-telling.' Fairy tales and other nursery stories told in the kindergarten give place in the lower forms of the school to legends, heroic tales, and histories which excite feeling and stimulate imagination, making a deliberately æsthetic appeal.

Two conditions seem necessary to extract the greatest value from these: the stories should be national or racial, and they should be in verse. What can be given to the English child which will be to him what the Odyssey and the Iliad were to the Greek boy, what some folk-tales are to the German child? One reply to this difficult question suggests itself which need imply no want of reverence. The English Bible was so identified with early education in the past, the book itself is on so high a level of literary achievement, that it may be described as an English classic whose contents have become worked into the literary consciousness of our people. There is a constant recurrence of its phrases in conversation as well as in books, a spontaneous, almost unconscious, use of its words in all sorts of contexts and by all sorts of persons. But the English Bible is of course not national in origin, and its poetic *form* is not always obvious to children.

The double test is satisfied by the old ballads nowadays accessible in modern reprints and in studies of ballad-literature generally. 'Chevy Chase,' 'Sir Patrick Spens,' 'A Lytill Geste of Robin Hood,' 'Robin Hood and Guy of Gisborne,' 'Sir Andrew Barton' still keep their charm for children as well as for men and women of unsophisticated tastes. Nor must songs be forgotten. Increasing attention to British folk-song has given us several collections. Those who are not familiar with these, or with the local songs of

their neighbourhood, will find a long list, English, Scottish, Irish, and Welsh, in the sixth Appendix to 'Suggestions for the Consideration of Teachers.' The tenth chapter ('The Teaching of Singing') of the same work has some admirable words on the early æsthetic training of children.

But choice is not restricted to stories which are national, whether historical, legendary, or purely fictitious. Stories from classical mythology; the legendary tales of early Greece and Rome; stirring narratives from history, local, national, general; characteristic anecdotes of great men and women of all times and races afford material in abundance. The aim of these first steps in literature is emotional rather than didactic; it is not the moral teaching of the stories nor an exercise of the understanding, so much as an appeal to emotion and imagination that is in place. The pleasure to be derived from rhythmical speech, heard or shaped by oneself, and the delight which comes from imaginative exercise are possible for probably more children than their elders suppose.

But this aim is not to be pursued directly. To make pleasure conscious to the intellect, to analyse its nature, to lay down laws concerning the beautiful and the ugly are beyond the intelligence of children. Yet what they cannot understand they may be quite capable of feeling. Hence the general rule as to procedure in the æsthetic training of the young. Proceed by suggestion, not by prescription. Put before them that which you wish them to admire and to imitate; keep from them as much as may be whatever they ought to loathe and avoid.

The rule neither applies to education as a whole, nor to æsthetic training throughout, but it is the only practicable one in the early stages of teaching. In all young creatures the instinct of imitation is strong; by yielding to it they master the traditions of their society

and so fit themselves to live its life. Habit is thus formed and taste is unconsciously cultivated; the child accustomed to good literature will find it hard to occupy himself with bad, should the opportunity arise of making its acquaintance. The principle cuts both ways, of course.

Reading.

The school term 'reading' signifies at least three different processes which it is in the interest of sound method to distinguish one from another. First, it means the intelligent study of printed matter. This is not a separate 'subject' involving a peculiar modification of method in its behalf, but it is rather one of the aims common to all schools; it is enough to say that, while instruction is directed to giving the knowledge and taste requisite for the appreciation of books, the instructor should also be careful to provide exercise for his pupils in the independent employment of books. In the second place, 'reading' means the art of reading aloud; and, thirdly, the term also designates the acquirement of ready associations between signs and sounds, a process somewhat different from the former and necessarily preceding it. Frequently, however, these two meanings of the term are not distinguished by the teacher, and the child's attention is distracted from the business of associating sounds with letters by attempts to achieve a premature command of the graces of elocution. An untimely cultivation of 'expression' or 'expressive reading' delays the pupil's advance in skill while it encourages a pale imitation of genuine feeling.

In English the ready recognition of the signs for sounds is baffled by two well-known peculiarities of the written notation. The same symbol stands for different sounds, the number of the latter varying from two to nine; and the same sound is represented by different symbols. As an extreme instance of the latter anomaly,

the vowel-sound in the following words may be put forward: O! Oh! owe, sew, sow, beau, hautboy, toe, yeoman, note, boat, soul.

The great majority of modern English words trace their origin to one or other of the old English dialects or to allied forms of Teutonic speech, to Norman-French or to Latin. And although the Latin notation was the model upon which these different languages framed their originally phonetic spelling, variations from the Latin standard were scarcely to be avoided, nor were these less marked at the period when the words containing them became constituent parts of written English. The long history of English as a literary language, coupled with the national disinclination to change, has further complicated matters. Much of modern English spelling is of the fourteenth century; but the pronunciation, which spelling was once intended to indicate, has altered so much even during the last three hundred years that 'it is not too much to say that the Bible as read now by you and me would be barely intelligible to its translators' of 1611.[1]

The consequence is that the English child who is learning to read is involved in the mazes of many notations, under the exasperating pretence of battling with one. The natural disposition of his mind to classify and generalise leads him to expect that the sign will change when the sound changes, that it will not change when the sound is unaltered, and that the letters will help him to the sounds. The English notation disappoints all of these expectations; in consequence, the process of learning to read English is not in itself educative.

The foregoing considerations were placed before the public some forty years ago by the late Professor Meiklejohn in a pamphlet entitled 'The Problem of

[1] Peile, *Primer of Philology*, p. 24.

Teaching to Read,' the immediate occasion of which was an instruction from the Education Department that reading primers should be written in monosyllables. Meiklejohn pointed out that this was no solution of the difficulty but an intensification of it, since of the thirteen hundred words whose spelling is at variance with their pronunciation, eight hundred are monosyllables and familiar to the child as parts of his everyday speech. Nevertheless, it was Meiklejohn's opinion that by adopting a system of classification of words, and by arranging the order of presenting them to the child, it was possible to minimise the trouble inseparable from an anomalous spelling. He showed that part of the English language is written in a spelling which assigns but one function to each letter, and that this part is large enough for the ordinary purposes of narrative, both in verse and in prose. He suggested that this portion only should be drawn upon in the first books given to children who are learning to read; no artificiality of diction or obvious 'cooking' of the language of these books would be required. In this way, the child's early experience in reading would be self-consistent and educative, while his progress would be rapid. Later, those parts of the language in which the same symbol represents different sounds could be drawn upon; and, lastly, those in which the same sound is represented by different symbols. In brief, he would keep back anomalies and 'exceptions' until command had been gained over the more law-abiding forms.

'The English Method.'

These suggestions were embodied in 'The English Method of Teaching to Read,' a set of three small volumes prepared by Messrs. Meiklejohn and Sonnenschein which still do good service in the school-room, not only in their own proper person, but also through

the help which they have afforded to other makers of reading books.

The recent development of phonetics has enabled Miss Nellie Dale to extend the application of the principle that the notation placed before the beginner should be a consistent one. The course described in her book 'On the Teaching of English Reading' begins with a stage preliminary to reading itself but preparatory to it; speech and its production are then the chief objects of attention. The exercise-ground lies in the conversation of teacher and children, and the performances of the latter are utilised so as to encourage the pupils in discriminating sounds; without reference to technical names the distinction between voiceless (or breathed) sounds and voiced (or vibrating) sounds is brought out, and attention is called to the various vowel-sounds. When the actual reading is begun, the words are so chosen as to maintain consistency of notation at first, anomalies of spelling being reserved for a later stage. In the first books employed, and in those only, vowels are indicated by red letters, voiced consonants are printed in black, voiceless consonants in blue, and silent letters in faintly visible yellow; no other phonetic signs are employed at any stage.

'Miss Dale's Method.'

In Miss Dale's system, reading is not a 'subject' whose isolation is scrupulously maintained, but an art which is in touch with all that takes place in the child's experience; it is correlated with the lessons in drawing, nature-study, geography, and object-teaching. A noteworthy feature of the reading-books consists in the coloured pictures by Walter Crane.

'The English Method of Teaching to Read' contains no pictures. Certainly these are not necessary; they may easily be overdone, and they always increase the bulk and the cost of the book. The excessive use of

pictures in books for children hinders the free play of the reader's imagination, and to that extent makes his reading a less actively constructive exercise. There can be but few English children for whom the conventional cat, house, or pony of the reading-book is other than an impertinence. Pictures or no pictures, the inspiriting agent in all early reading lessons must be the teacher; enthusiasm and resource, admirably exemplified in Miss Dale's books, are the means by which the drudgery of the task may be mitigated.

Spelling.

Both the systems described above seek to make learning to read an educative process by exercising intelligence upon the signs whose associated sounds the children are learning to recognise. The difficulty of doing this lies in modern English spelling, and though spelling reform is not primarily a schoolmaster's question, there are certain aspects of it which press themselves upon his attention. Spelling is a real difficulty for English boys, which, like our weights and measures, adds enormously to the time and energy consumed in learning. The German boy and his schoolmaster get a start of their English friends which must be reckoned in months at least, simply because their spelling is phonetic and their measures are decimalised.

After all, spelling began by being phonetic. Since the growth of phonology, not much force is left in the argument that spelling must be kept in the ancient forms if etymology is not to be obscured; the modern philologist concerns himself primarily with sounds and not with their symbols. Further, our spelling is not only anomalous; it is also sometimes perverse, as Professor Skeat has pointed out in 'The Problem of Spelling Reform.' He quotes John Ray, who wrote as follows in 1691: 'I might also note many false spellings in particular words, as . . . *scituate* for situate, which

is but lately come up and hath no appearance of reason, the Latine word being *situs* without any *c*. *Scent* for sent, signifying a smell or savour, which writing is also but lately introduced and hath no more ground than the former, the Latin word from whence it comes being *sentio*.' Similarly Skeat says: 'To write axe [for ax] is due to mere caprice,' 'we actually use *ache* for *ake*,' 'the double *m* in *commence* (O.F. *comencer*, It. *cominciare*) is ignorant and ludicrous.'

While the schoolmaster has no choice but to conform to usage, it is highly desirable that he should keep an open mind in respect of changes in spelling. Newspaper writers in the character of guardians of the English language are somewhat in the position of Satan reproving sin. Skeat says, in reference to the story of spelling reform in 1881, 'The indignant writers were discussing a subject which they had never studied, and which they did not understand; and they did so with perfect honesty, because they were not in the least aware of their ignorance.'[1]

Spelling being addressed solely to the eye, it would seem that it should be learned by the eye and not by the ear or lips. It is very doubtful whether it is ever really learned by chanting letters in chorus or by any other merely oral repetition of letters, except in the comparatively rare case of children whose mental images are purely auditory or motor. Experience supports this *a priori* opinion that in the majority of cases spelling is learned, when it is effectively learned, by much reading and writing. It is one of the merits of any system of teaching to read which maintains a consistent notation that spelling is learned *pari passu* with reading, no special lessons for the purpose being required.

The real difficulty of teaching English children to

[1] *Op. cit.* p. 14.

read the mother-tongue lies in the English notation; when that is solved, the question of the best mode of introducing children to the written language is of minor importance. In discussing this question it is usual to contrast the 'phonic' with the 'look-and-say' method so called; probably the balance of opinion is in favour of the latter. But it is to be feared that in actual practice, counting all lessons in reading given in the school-room and the nursery, neither of these devices matches in popularity the 'alphabetic' plan. Children are first taught the *names* (not the corresponding sounds) of the letters of the alphabet, and next the combination of these in words, as, 'see ay tee' 'cat.' If the sounds, not the names of the letters, were learned, and if further the spelling were phonetic, the plan would be defensible. It was, in fact, the plan in use in schools when boys were taught to read Latin, and for that phonetically spelt language it was suitable. The ingrained conservatism of the school-room transferred the plan without modification to the unphonetically spelt vernacular when in the late fifteen hundreds the schools began to teach English boys to read English. The combination to-day of an anomalous spelling with letters whose conventional names are more familiar than their phonetic values makes the 'alphabetic method' a very unintelligent mode of teaching.

So-called 'Methods.'

The substitution of the sounds of the letters for their names when teaching children the alphabet was proposed by that universal genius, Blaise Pascal, for the benefit of his sister Jacqueline, who was then in charge of the girls' school of Port Royal. A phonic system of teaching reading, in which the recognition of words is attained by considering synthetically the sounds represented by the constituent letters, has many difficulties to face when French or English is the lan-

guage being taught. But with the development of the study of phonetics and the increasing use of phonetic script for different purposes, these difficulties are less formidable. The experiments in teaching reading by means of a phonetic alphabet have not been numerous enough to permit generalisation ; it is certainly desirable that such experiments should be tried.

The 'look-and-say' plan has the theoretic advantage over the others that it is analytic, and therefore more suitable for beginners ; moreover, the practised reader 'looks and says,' but does not spell—that is, a written or printed word is recognised as a whole, with small conscious reference to its separate letters. It is objected that the plan is 'a Chinese one,' that every single word has to be considered individually ; but the objection ignores the rationalising tendency of the pupil. Another objection is that, attention not being given to separate letters, spelling is learned amiss or not at all ; but Jacotot, the populariser if not the inventor of the plan, always closely combined the writing lesson with the first lessons in reading.

Composition.

The earliest lessons in written composition should spring without any abrupt transition from the oral exercises ; and the cardinal rule of the latter, that the subject-matter should be familiar to the pupil, must still be borne in mind. At the beginning of the course in written composition, the manner of his writing should be the pupil's main preoccupation, and not its matter. Topics which satisfy the condition are such as these : summaries of lessons, accounts of everyday experiences, the half-holiday, the walk, a public building, a street scene, a game, a favourite book.

Even these are not equally apposite for the purpose ; the simplest are such as require the narrative form. The order of difficulty would seem to be, first, narration ;

second, description; third, invention, that is, an active exercise of imagination; and last and most difficult, reflection, expressed in what used to be called 'discourse,' or the essay.

Narration.

The conviction that narrative is the easiest form of writing no doubt explains a practice long prescribed by the English Elementary Code, but now abandoned. That document formerly required no composition exercise in any 'standard' below the fifth, and in that standard pupils were only asked to reproduce the substance of a story read to them. It is matter for regret that some entrance examinations to public schools retain this particular form of test, since it is contrary to the fundamental idea that a composition is the expression of the thoughts of the writer. The exercise in question encourages a slavish imitation not only of another person's manner, but even of his very words; and very frequently the attempt to recall those words distracts the writer's attention, so that the unity or the point of the composition as a whole is lost. In the best of circumstances, the self-expression of the writer is but small.

There is less objection to the reproduction (and more especially the oral reproduction) of a story which has been told, not read, because the teacher is likely to use a diction so familiar to the boys' ears that their minds will not dwell upon single words or phrases. They are on that account more disposed to reproduce the thought than the expression.

Description.

Narration is an easy form of writing for beginners, partly on account of its concrete and pictorial character which is akin to the mode of thought of most children, but chiefly because a story carries its own order or arrangement with it, and the pupil is simply required to develop the tale. But in description the best order of arranging the constituent

statements is not always obvious, although it is vital to success. Hence when description is the purpose of the composition, arrangement must be studied, as it must also in some narratives. Some teachers for this purpose dictate a preliminary outline, or set down a sequence of 'headings' on the blackboard; the matter however requires a more delicate handling, if composition is to be the expression of the *pupil's* thought. The teacher and the class may together work out a skeleton on the blackboard, and for the earliest descriptions they may together proceed to fill in the framework so constructed. The more the teacher can confine his share to guidance and suggestion, the less will he contravene the fundamental idea of the exercise. A little later, these co-operative efforts should be limited to the outline, and after that even this assistance should be withheld.

Invention.

The reproduction of a story is a first step towards the making of one independently. The pupils may be asked to do in writing what they have been previously called upon to do by word of mouth—that is, to add an episode to a story already known, to substitute an adventure for one occurring in such a tale, or to make a new story. Success will vary with the reading habits of the class and the nature and copiousness of the earlier oral composition.

'Plain Prose.'

The standard contemplated is the modest one known as 'plain prose.' One of the greatest difficulties experienced by boys who have not yet attained that standard is the selection and right employment of conjunctions. The trouble is acute where oral composition has been neglected; boys will then write long and amorphous passages with never a 'stop,' the *disjecta membra* being feebly attached one to another by 'and so,' 'so,' or

similar particles repeated to weariness. The remedy lies in making such writers confine their work to short, independent sentences almost destitute of conjunctions; when facility is gained in writing in this way, attention may be called to its disagreeable jerkiness, and improvement proposed. The teacher then shows at the blackboard how three or four sentences so written can be welded into a period, and the composition exercises immediately following may turn upon the conversion of short sentences into sentences compound or complex. The blackboard demonstration is also needed to correct the ambiguous use of pronouns —another fault which is more than usually frequent if it has not been dealt with in oral exercises.

Imitation.

Meantime, the pupil's study of the mother-tongue has been proceeding in other directions than composition; his reading of good literature will make some forms of 'imitation' in the technical sense possible, and paraphrase is usually proposed to that end. The objections to the exercise are well known. What Ascham calls the turning of 'pure gold and silver into foul brass and copper' seems not only a superfluous but a mischievous business, since it tends to make a boy think that expression is indifferent. Thus, 'Horror sat down on the top of his hat' is thought to be an equivalent for 'upon his crest Sat Horror plumed.' There is the ever-present danger of treating a fine passage irreverently, and pupils are frequently called upon prematurely to analyse such a passage before they have developed the necessary critical faculty.

An imitative exercise free from these defects consists in filling blanks made in a piece of good prose or verse, the insertion of the right preposition, conjunction, epithet, or phrase, comparing the insertions with the omitted original and discussing differences as they

arise. In some such desultory way as this a beginning may be made with the study of rhetoric, since metaphor, simile, and the figures generally will from time to time demand consideration.

Paraphrase is officially commended in the 'Four-Year Course' for English secondary schools. It is least objectionable where it is oral and not too premeditated, and it may be said that it is a test whether the pupil understands his author; it also furnishes exercise in the use of synonyms and enriches a boy's vocabulary. But it does this at a rather heavy price. There are other roads to the same ends, notably reading, a practice which received scant encouragement in the less recent modes of teaching English.

The mechanism of verse, rhythm and rime, should be made clear to the pupils in familiar types like the ballad measure and 'heroic verse,' and pupils should be encouraged to imitate these forms. A class is almost certain to contain one or two who 'lisp in numbers'; it will be wise, however, not to press versification too heavily upon the others, and in all cases it is best to propose only the simpler forms for imitation. To challenge a class to a sonnet is not a thing for every school. The study of the more elaborate verse-mechanism belongs to more advanced pupils, and its imitation is not here in question.

As the pupils move beyond the narrative or descriptive stages of writing, independent thought and its concise expression call for attention. The 'abstract' or *précis* has been recommended as a good exercise-ground for the latter. To make a brief but pregnant summary of a lesson, lecture, or speech is an exercise in several good things at once, including conciseness, and one which may be applied to writing which is good, without (as in paraphrase) desecrating the excellent. But the *précis* in its technical form (*e.g.* *précis* of official

documents for purposes of a Civil Service examination) has no exclusive claim upon schoolboys, and its use is to be deprecated as being one of the already too numerous suggestions of the school-room that the end of life is to occupy an office stool.

The Essay.

It is an unfortunate perversion of terms which allows the word 'Essay' to stand as a general name for almost any piece of connected writing; the consequence is that the schoolboy fails to appreciate the distinctive character of the essay, and to realise the apprenticeship which must be served before essays can be written. Outside the class-room the term stands for a composition distinguished, as to its thought, by reflection and, as to its expression, by the individuality of the writer, by 'style.' In this sense the essay lies beyond the region of plain prose, and may fairly be set at the head of school exercises in the art of writing. It argues in the author the attainment of a definite stage in his mental history, some knowledge, some reading, and a critical attitude towards composition. The ability to employ the period may be accepted as a fair test of capacity for this sort of writing, though essays are not necessarily written in periods.

It follows that the true preparation for essay-writing is to be found in the discipline of the school as a whole rather than in any specific measures. Still, some formal exercises addressed to the *technique* of the essay may be regarded as preparatory. These will include the weaving of compound sentences into the complex form, and hence the logical employment of conjunctions; the construction of a paragraph upon a single theme; the connexion of paragraph with paragraph by the longer connective forms ('however,' 'moreover,' and the like), and by the use of words which throw the thought back to preceding statements.

It is usual to say that the subjects proposed as themes for essays should be within the range of the pupil's knowledge, and the demands of some schoolmasters and of many examiners justify the stating of such a platitude. But if composition is in truth the expression of the *writer's* thought, then by preference the topics to be treated in essays should be self-chosen and not prescribed at all.

Grammar.

The distinction between the scientific study of a language as exhibited in its grammar and the attainment of the *art* of speaking the language is now generally recognised; as a consequence it is no longer held that a vernacular speech is acquired through its grammar. A knowledge of the grammar of the mother-tongue as grammar is of course an aid to correct vernacular speech, just as a standard or pattern serves to improve execution in any other art, but that is a different thing. It was for this reason that Locke would remove grammar from the studies of children to place it amongst those of youths and men who, having already acquired the art of speaking the language, were now intent upon speaking and writing it with some distinction. This is to make grammar an ante-chamber to rhetoric; the teacher of composition economises time when he and his pupils have standards expressed in a general form to which their errors may be referred. There is an advantage also in using the familiar mother-tongue as the medium for first communicating those notions of the philosophy of language in general which underlie the logical study of a foreign language, though different vernaculars possess the capacity to do this in different degrees, English not being one of the best. These considerations suggest that the grammar of the mother-tongue is a study for those who have already commenced to write the language.

The gymnastic value of grammar is frequently urged as the reason for teaching it. As it is devoted exclusively to the *form* of the language, it continues and greatly extends the processes of classifying and generalising which the pupil began when he learned to read, assuming that the method of his instruction in the art was sound. But the gymnastic is easily overdone, and in fact is constantly overdone in the text-books by the use of classification for its own sake, by a premature anxiety for definition, and generally by over-attention to form as such. Thus the manual of English grammar too often becomes a modern analogue of the arid subtlety of scholasticism at its worst, with the peculiar faults of inadequate definition and cross-division added. It is curious to observe in grammar books devoted to modern English the readiness to diverge from language into metaphysics which was characteristic of medieval Latin 'grammars,' a characteristic which disappeared in that quarter centuries ago.

Inductive Teaching.

This excessive attention to the formal aspect of the mother-tongue follows naturally from the deductive mode of teaching it which was once the universal practice. A body of definitions, classifications, and rules, with scanty illustrations of these, and the whole applied in parsing exercises, constituted the study. But the conditions of the case permit, if they do not demand, an inductive study which may be made more fruitful. The speaker of a language is in a position to study its grammar through a copious body of examples ; he has before him not a dead body for dissection, but a living organism for observation through its functions. Grammar in this case is a body of principles which the student may elaborate from the study of examples. In such a method, Form, whether as definition or as rule, occupies only its due place.

While the grammarian has moved toward this conception of grammar as a school-study, the psychologist has pointed out that the unit of thought is not the word (or rather its mental equivalent) but the judgment which is expressed by the proposition. Thus the older kind of instruction which concerned itself mainly with single words, parsing being typical, has been replaced or supplemented by 'analysis of sentences.'

Analysis of Sentences.

The change has not always exorcised the mechanical spirit from the grammar lesson; formalism is as possible in analysis as in parsing. The customary 'table' in which grammatical analyses are set forth is in part responsible for this. Children commonly begin an exercise of this kind by ruling lines, constructing pigeon-holes and labelling them with the same invariable stock of labels, 'subject,' 'extension,' 'predicate' (often erroneously limited to the verb), 'object,' &c. The consequence is that the duller sort think that there is only one form for every sentence and that into that form every sentence must be squeezed, thus reverting to the notion that dissection of the dead is the business of grammar. Sir Joshua Fitch[1] proposed to treat every sentence on its merits, writing the several members in a vertical column and setting its description horizontally against each. While this plan rightly respects the individuality of sentences, it lacks the essential quality of showing in a graphic way the relation of one member of the sentence to another.

The *schema* exemplified below is intended primarily for the teacher's use at the blackboard, though scholars may also use it for rough drafts before setting about a parsing exercise; it may profitably supersede the customary 'table' wherever its few and simple conven-

[1] *Lectures on Teaching*, p. 268.

tions are understood. These are as follows. A vertical line separates the two main divisions of the sentence, subject and predicate; two horizontal lines distinguish the chief word, the *verbum*, around which the sentence turns; if the verb is transitive, it is united to its object by a short vertical line; the indirect object and adverbial clauses are joined to the verb by an oblique line running down from left to right; an oblique line running down from right to left indicates adjectival relation. These are the only marks required and no technical terms are written upon the *schema*, which may be used for simple, compound, and complex sentences indifferently. If there are more sentences than one, each is indicated by its own letter or number, which may be used in any written notes that may be deemed necessary. Of course, not every one of the lines enumerated above will appear in the analysis of every sentence; if there be no adjective or adjectival relation, there will be no oblique line from right to left, and so on with the rest.

Let the sentence be 'In that year the brilliant seaman gave to his country a gift which was priceless.' In the *schema* this stands thus:

(A) seaman | gave
/ the brilliant | \ in that year
| \ to his country
| a gift
| / sentence B

(B) which | was——priceless

Again, a simple sentence whose verb is part of 'to be' may be thus set out:

Edward I. | was——King of England
| \ in 1280

The chief humanistic discipline to be obtained from a language lies in the study of its literature. Grammar is a science; composition, while it involves appreciation of the beauty of rhythm and a just use of words, is the result of understanding and practising such powers of expression as the particular language possesses. These appeal primarily to the intellect. But in literature there is a claim upon men no less comprehensive than is human life itself.

English Literature.

In education, the moral function of literature is rightly accorded the first place. But the epithet must be interpreted largely. Literature is only exceptionally didactic in the strict sense; that it should not 'preach' or consciously moralise is a requirement especially in order when its students are children. The most impressive moral lessons are those derived from observation of the actual doings of men; and lessons so based have the further educational advantage that it is the onlooker himself who draws inferences and passes judgment.

Moral Function.

It is this indirect, but personal and impressive, moral teaching which literature is competent to give. All are agreed that a man's intercourse with his fellows is a power of the first rank in his moral education. Literature very greatly increases the sphere of human intercourse, and does so in no fortuitous manner. The pictures of human life which it presents are drawn by master-hands, who have carefully selected their materials so as to achieve the fullest effects. Here are prophets and preachers, whose lessons are the more convincing the less they are didactically formulated.

Hardly inferior to the moral function of literature in education is its æsthetic. The charm of rhythm, whether of movement or of sound, seems to be felt universally, as witness the so-called 'dances' of savage men,

the 'chanties' of sailors and of children at play. Subtle as the rhythm of speech often is, children can appreciate it, in differing degrees, of course. Almost every child finds pleasure in a song; some children enjoy the melody of a verse whose words they do not understand, taking pleasure in pure sound, as others will find joy in the pure colour of a picture whose ideas lie outside their ken. Beyond the beauty of form there are also the attractions of metaphor and of the rhetorical figures generally, the fitness of word to thought, the intellectual beauty of the ideas portrayed. By giving its votary a means of spending leisure time in a manner which accords with what is best in his nature, literature adds to the grace as well as to the social strength of life.

Æsthetic Function.

These things may be said of any literature worthy of the name. But the literature of the mother-tongue has a moral and æsthetic power in direct proportion to its intimacy; here, if anywhere, may all who are in the least degree susceptible to the charm of 'letters' find satisfaction. Nevertheless, neither the moral nor the æsthetic value of English literature has been proposed to English children in the past as the chief purpose of its study. Teachers have been intent for the most part upon some branch of philology, upon some scientific discipline to be derived from the language of literature, the nice observation of words, the discrimination of shades of meaning, the relation of word to word, of language to language; or a more purely literary handling of the theme has spent itself upon the minute criticism of literary forms, as when conclusions as to the authorship and date of a work have been based upon a comparative study of verse-endings, and the like. In short, the aim has not been the human one, but 'scholarship'

Philology and 'Scholarship.'

in the restricted meaning of the term, the 'scholarship' which has been most at home for the last three or four centuries in the two 'classical' tongues. The reason is not hard to discover. The convenience of the examiner has found a ready ally in the conservatism of the school-room; English literature, when at last it found a place in the time-table and became a recognised 'subject,' was taught as 'classical literature' was taught, just as the method of teaching the Latin language was transferred to instruction in French and German.

But philology is science and literature is art, and it is vain to look for the fruits of one from the teaching of the other. Moreover, philology does not appeal to all minds, and many boys will gain a more effective education from science of another order. Schools ought not to go on ignoring the fact that boys and girls possessing the tastes and capacities of the 'scholar' are in a minority, perhaps even in a small minority; teaching should avail itself of literature as such, and of those aspects of it which make an almost universal appeal.

The philological method, with its minute verbal studies, its volume of 'notes' (so bloated that an editor of Virgil writes of 'the text attached to these notes'), is not the method for general use, nor is one small classic enough for a term's reading. The aim should rather be the steady working through of large tracts of the author to be studied, familiarity with much that he has written, and small attention to the editor's notes. The older type of school-book should be replaced in the hands of most school-boys by texts with the bare minimum of notes needed for understanding the author's meaning. Dr. Rouse's 'English School Texts' (Blackie) and Mr. Guthkelch's 'English Texts for Secondary Schools' represent the kind of book desired.

The earliest stage of the study of literature belongs

to the nursery, the kindergarten, and the lower forms whose pupils have not yet developed logical thought to the point where 'subject' is differentiated from 'subject.' The stage is in fact a desultory one, lasting till the scholars reach the age of ten or eleven; its beginning does not depend on the pupil's ability to read, since much may be done by reading to him or by 'story-telling.' The official 'Suggestions for a Four-Year Course in English' suffer from the fact that the reading which they propose *begins* at the age of twelve; much of what is there suggested as reading-matter suitable for pupils between the ages of twelve and thirteen may certainly be studied in kind at least at an earlier time. This is more particularly true of the prose recommended.

Teaching by Suggestion.

With the introduction of independent reading by the pupil, a second and more systematic stage of instruction is reached. The teacher's attempts to excite and foster taste will necessarily take an oblique route, suggestion being relied on, and this operating chiefly through the choice of books to which pupils have access. For some children it would suffice to give them the freedom of all that is 'open' in a good library; hence the value of a well-chosen collection of books placed at the disposition of the pupils in a form-room or in a children's room with its librarian at the public library. It was to such indirect means as these, supplemented by the occasional advice of his tutor, that the public schoolboy of an earlier generation frequently owed his knowledge of English literature. But the many will need a more express instruction. Thus, the teacher of these boys and girls under twelve may form a short list of writings (not writers) in prose and verse suitable for his pupils at this stage. In some schools such a list would be most conveniently embodied

in the class reading-books ; [1] these compilations ought in any case to be constructed with a single eye to their literary merit, as that is either at or *just above* the level of appreciation reached by the pupils in question. The subject-matter should not greatly differ as to its nature from that of the preceding stage—that is, it should be picturesque, marked by 'plot,' dealing with the simpler passions (of which pugnacity is one), good, but not at all 'goody-goody.'

When the reading of authors is once begun, the exposition of passages is frequently required of the teacher. Whether the pupils belong to the lower or to the higher forms, an analytic method of explanation is to be preferred to the plan of giving synonyms for the 'hard words' of the original. Inasmuch as the sentence and the phrase rather than the single words are the units of thought, the difficulty of understanding a passage approximately does not arise from ignorance of the meaning of separate words, though such ignorance prevents a precise, complete understanding. In many cases, reading the passage aloud to the class, deliberately and well, would be the most illuminating kind of commentary which the teacher could undertake ; a really good reader cannot fail to convey the gist of a passage to his hearers, even though they remain in doubt concerning a word here and there. Such reading should, therefore, be the first step in the exposition of a passage. Then attention would be turned to its component sentences or phrases, beginning with the central idea which, it may be noted, does not invariably come at the opening of the passage. Lastly, single words are taken up, their meaning given or synonyms intro-

Exposition.

[1] See, for example, such collections as those named at the close of this section.

duced, and the words themselves are appropriately set in sentences made by the scholars.

But it is not to the intellect alone that a fine passage appeals, and it is easy to overdo explanation, more particularly with younger pupils. A precise intellectual appreciation of every word will be too dearly bought if it leaves the boy no room for imagination or sympathy. Only a pedant would deny the æsthetic value of what is but partially understood in literature, and *he* may be invited to account for the fascination of the 'Ancient Mariner' or of Edgar's 'Child Rowland to the dark tower came.' The principle applies as well to the choice of books for children's reading as to the exposition of what is read. It is quite possible to be too solicitous in selecting 'suitable' books for children, for whom indeed not much in literature was ever especially written.

Reading-books.

On the other hand, schools would be improved by the elimination of a whole class of reading-books too frequently placed in the hands of school-children. These are the purveyors of miscellaneous information, of lessons pretending to be scientific, of twaddle from the lips of supposititious uncles, and of other devices for diverting the reading lesson from its proper business of helping the child to master the mother-tongue. Most of the topics in which such books dabble are best learned, not by reading, but through the conversational plan of the good oral lesson, or experimentally in the laboratory or in the demonstration lesson. But the chief objection to this kind of book is not that it endeavours to teach its topics in the worst possible way, but that it robs those who cannot afford the loss of an excellent opportunity of learning what literature really is.

Practice in reading aloud is one effective means of fostering the appreciation of literature; of course, such

reading as is merely auxiliary to 'learning to read' in the first stage is not meant. But, valuable as the practice is, its usefulness for this purpose is very commonly impeded by the employment of 'simultaneous reading' (reading by the whole class at once in chorus) and by the teacher's premature desire for 'expression.' Simultaneous reading was no doubt invented to save time by ostensibly giving every member of the class something to do; but it makes individuality impossible, and is therefore a bar to the growth of taste. Although discredit has been thrown upon the practice when adopted as part of the reading lesson, a somewhat unwise following of German models is beginning to give it a vogue in the modern language lesson, where it is likely to repeat its mischievous consequences. Misplaced zeal for 'expression' ('expressive' reading) has given rise to what is called 'pattern-reading,' a somewhat exaggerated rendering of a passage by the teacher, which the pupils repeat either simultaneously or singly. The result is a mere parrot-like imitation, too uniform to permit any individual variation from pupil to pupil. Understanding must precede interpretation. Hence the pupil should not be expected to read a passage aloud before he has had the opportunity of getting at its meaning, through the teacher's exposition, through his own silent pondering of the passage, or through inquiry as to the meaning of words. The exercise is analogous to singing or playing from music; the understanding and feeling *of the performer* must be evoked if any educational value is to be secured.

Reading aloud.

There is, of course, room for demonstrations of good reading by the teacher, model readings given from time to time, but seldom if ever as pattern for immediate imitation. Both 'pattern-reading' and 'simultaneous reading' tend to rob the pupils' reading aloud of what

should be its first virtue, namely, that combination of audibility and intelligence which is called intelligibility.

Learning by Heart.

Pleasure and profit flow from the possession of such a hoard of good things as every boy and girl should store in memory from the spoils of the literature lesson. The pleasure need not be purchased too dearly, since much may be learned *memoriter* without express effort, but by the familiarity which follows repetition in different exercises, in reading aloud, in 'talks,' in composition lessons. The immediate profit obviously lies in the resulting improvement in vocabulary and diction, and in the retention of model forms. For purposes of *class* instruction it is necessary to set a 'piece' which all are to learn; but it need not be a lengthy passage. If the memory exercises are to foster taste, then pupils must be allowed a certain freedom in selecting what is to be learned by heart. Occasionally, a boy should be given the opportunity of reading aloud or of reciting from memory some favourite or self-chosen passage in prose or verse; the practice is paralleled in the teaching of music, an analogous art to reading aloud.

Criticism. First Steps.

In the lower and middle forms the teacher's efforts to encourage the growth of taste are limited to suggestion; but with pupils whose age exceeds thirteen or fourteen a more didactic method is desirable. At first analysis is quite informal, its scope and direction being indicated by such questions as 'Do you like this story, or poem?' '*What* do you like, or dislike in it?' The teacher may go on to state his own position in respect of these points, adding his reasons, but not forcing opinion, lest literary cant take the place of genuine feeling.

When principles of criticism are introduced, it should

be in close association with some concrete example and the consideration of other passages or works which resemble it. Such a treatment arises naturally, even spontaneously, when dealing with the writings of the essayists named in the Fourth Year of the official 'Suggestions for a Four-Year Course in English.' The reading of expressly critical writings follows.

It may be argued that in these higher forms it is well to unite a minute study of one book with the cursory reading of many. With pupils of fifteen to sixteen and upwards the opportunity arises to study prosody, rhetoric, and style in a fuller, yet more concrete, way than arose out of the composition lessons of their earlier years. But those who assert the indispensable nature of minute scholarship, grammatical and philological, the claims of archæology and the like, would do well to remember that these things may drown literature. A girl, who was twitted with her grave fashion of dealing with a humorous piece of literature, replied that she was too busy with the Latin to see the joke! The case is not infrequent.

The Four-Year Course.

The publication by the Board of Education of a list of texts which the Board thinks suitable for inclusion in a Four-Year Course on the English language and literature is a very welcome token of a change in our mode of treating the vernacular literature for educational purposes. It would be stupid and ungracious to cavil at the official 'Suggestions,' as they are modestly named, but one or two remarks on the list may not be misplaced. The ballads, heroic stories, and 'Robinson Crusoe' would in some schools certainly be good material for boys and girls younger than twelve, the age at which the official Course begins; so also some of the biography and historical novels might fittingly come at an earlier age. History, indeed, might receive a little

more attention than is accorded to it. For example, pupils who are studying a 'period' in history might include in their literature course for rapid reading a book, or books, belonging by authorship or contents to that period. For example, if the period were 1603–1714, the reading would appropriately include a play of Shakespeare's, Bacon's 'New Atlantis,' 'Lycidas,' 'Areopagitica,' an essay by Macaulay, some of Addison's 'Spectator' papers, Thackeray's 'Esmond.' If the period were the sixteenth century, More's 'Utopia,' a play of Shakespeare's, some Spenser, 'Kenilworth,' 'Westward Ho!' and some of Bacon's essays would heighten the historical interest without doing violence to the study of literature.

A French Course.

It is instructive to compare the list of authors which the Board of Education has suggested for study by boys and girls between the ages of twelve and sixteen with the list prescribed in the French *Plan d'Études* for boys of about the same age. The English list is only tentative in character, and it is not based upon any definite scheme of reading pursued before the age of twelve. It will be seen that it is more elementary than the French, and less historic in the sense that the development of the literature, an integral part of the French scheme, is not made evident.

The following is the list of authors prescribed by the *Plan d'Études* for the four classes[1] of the Latinless, scientific Division B, 1st Cycle. The list for each year is prefaced by the common rubric 'Select passages in prose and verse from the French classics. The same collection may be used throughout the Cycle'; not all the authors named below are to be read, but only those which the teacher selects year by year.

[1] See Part I. Section VII., p. 100, above.

First Year.—La Fontaine, 'Fables,' Books I. to VI.; Fénelon, a selection of fables and dialogues; Buffon, selected descriptions; extracts in modern French from the medieval poets and prose-writers; some poets and writers of stories in the nineteenth century.

Second Year.—La Fontaine, 'Fables,' Books VI. to XII.; Fénelon, Télémaque; Boileau, selections; Racine, 'Esther'; the 'Chanson de Roland' in modern French; nineteenth century writings as in the first year.

Third Year. — Corneille, 'Le Cid'; Molière, 'L'Avare'; Racine, 'Athalie,' 'Les Plaideurs'; Voltaire, 'Charles XII.'; Michelet, Extracts from the History; stories from eighteenth century writers, selections from nineteenth century poets.

Fourth Year. — Corneille, 'Horace,' 'Cinna'; Racine, 'Britannicus,' 'Iphigénie'; Molière, 'Le Bourgeois Gentilhomme,' 'Les Femmes Savantes'; Bossuet, 'Oraisons Funèbres'; Chateaubriand and Hugo, in selections; stories from seventeenth and eighteenth century writers; scenes from comic authors of the same period.

'English' in the Time-table.

One other comparison between English and foreign official documents dealing with instruction in the mother-tongue may be of service. The most recent issue (June 1907) of the 'Regulations for Secondary Schools' dispenses with the rules which required a certain minimum number of hours to be devoted weekly to certain subjects or groups of subjects. These now superseded rules gave as the minimum for the group comprising history, geography, and English four and a half hours per week, divided into

three or four periods, one of which might be preparation at home. In the Prussian system, the school which answers best to the English Four-Year Course of our 'Regulations' is the Realschule, with its six-year course terminating about the age of sixteen. It is only in the two lowest classes that the mother-tongue appears in the time-table united with another subject. In the last four years German, history, and geography are treated as three separate studies, each with its own *quantum* of hours per week. One-tenth of the total number of hours spent in school is given to German in C and D schools, one-sixth in D[1] schools, in the last three of these four years; the fractions are greater still in the first of the four years.[1]

Taking Prussian secondary schools as a whole, it may be said that ten per cent. of the thirty hours or thereabouts which make up the school-week is devoted to the vernacular as a separate study. French secondary schools have a smaller total of school-hours per week, twenty-five being about the average; the percentage of time given to the French language and literature is distinctly higher than is the case in the Prussian schools, falling nowhere below eleven per cent., except in the highest class, where French is an ever-present object of attention, though it is absent from the time-table.

These facts suggest that the English minimum was altogether too low. With reference to instruction in the vernacular language and literature, it may be safely said that, where a school accepts that minimum as sufficient, the many casual opportunities for practice or for express teaching which arise outside the limits of the time-table must be utilised to the utmost.

[1] For the meaning of these letters, see Part I, Section VI., p. 73, above.

FOR FURTHER READING.

General.

Carpenter, Baker, and Scott, *The Teaching of English in Elementary and Secondary Schools*, 1906. Longmans. 6*s*.

'The Teaching of English' in Welton's *Principles of Teaching*, Chaps. IV.–VIII.

Suggestions for the Consideration of Teachers. [Cd. 2638.] Chap. IV.

F. H. Dale, 'The Teaching of the Mother-tongue in Germany' in *Special Reports on Educational Subjects*, vol. i. (C. 8447).

R. Wilson, *Lingua Materna*, pp. viii + 208. E. Arnold, 1905.

Speech, &c.

A. Burrell, *Clear Speaking and Good Reading*. Longmans.

P. A. Barnett, 'Audible Speech' in *Common Sense in Education and Teaching*.

Collar and Crook, *School Management*, Chap. VII. Macmillan.

Reading.

A. Sonnenschein, *The English Method of Teaching to Read*. Macmillan.

Nellie Dale, *On the Teaching of English Reading*, 1903. Dent.

Laura Soames, *Phonetic Method for Learning to Read*. Edited by Professor W. Viëtor, 1897, &c. Swan Sonnenschein. In separate booklets, called *Teachers' Manuals*, *Child's Key*, *Readers*.

W. W. Skeat, *The Problem of Spelling Reform*, pp. 18. Oxford University Press for the British Academy.

Language.

S. L. Arnold, G. L. Kittredge, and others, *The Mother-Tongue*. Books I.–III., 1905. Ginn. 9*s*.

James Gow, *A Method of English for Secondary Schools*. Macmillan.

Literature.

A. Sidgwick, 'Hints on Teaching English Literature,' *Teachers' Guild Quarterly*, October 1906. (Report of lecture.)

P. A. Barnett, 'English Literature' in *Teaching and Organisation.*

Suggestions for a Four-Year Course in English. Board of Education leaflet, Form 123 S (G).

COLLECTIONS IN READING-BOOKS.

The Temple Readers. Edited by E. E. Speight. Horace Marshall.

Literature Readers. Edited by J. Adams. Blackwood.

Literary Reading Books. In Golden Realms (Junior Forms). *In the World of Books* (Middle Forms). E. Arnold.

SECTION III

GEOGRAPHY

'*Nichts ist geschickter, den gesunden Menschen Verstand zu wecken, als die Geographie.*'—IMMANUEL KANT.

What is Geography?—While it is commonly admitted that geography is a subject which should be taught in all schools, there is considerable difference of opinion both as to its scope and as to the best methods of teaching. This is partly due to its nature. Geography comes into close contact with many other subjects, and in almost all schools more than pure geography is taught in the geography course. Within limits this is both reasonable and necessary. Before dealing with geography as a school subject a few words must be said of the scope and methods of scientific geography.

The term 'geography' literally means a description of the Earth, but it should be noted that neither 'description' nor 'Earth' is used quite in the usual sense. On the one hand, more than mere description is involved; on the other, what is really 'described' is not so much the Earth, as a whole, as its surface. By its surface is meant a thin film, not more than a dozen or twenty miles thick, which man has partially explored. This film consists (1) of the lower stratum of the mobile fluid atmosphere which surrounds the Earth, and (2) of the outer part of the Earth's solid crust, together with the water which fills its greater hollows, traverses its surface, or penetrates its substance. Commonly the term 'surface' is used as if it included

only the latter, but it is highly desirable to acquire the habit of thinking of both the terrene and the atmospheric constituents together. The terrene surface without the atmospheric complement has no meaning for the geographer. Even in so elementary a matter as this, the synthetic character of his subject is well illustrated. The 'description' of this surface is for the most part restricted to the way in which the varying conditions of land and water, and the varying movements of air and water, are arranged on this surface. Geography is therefore frequently defined as the science which deals with the distribution of phenomena on the Earth's surface.

Geographical Analysis.—Considering the Earth as a unit, and this specially varied film as the part of it with which we have to deal, how can it best be subdivided? The all-embracing atmosphere meets water and land at a surface which is relatively smooth in the former, but more or less irregular in the latter. The first obvious distinction is between the ocean and the land-masses which break it. The two largest of these land-masses, the great islands of the Old and New Worlds, are commonly and properly subdivided into lesser units determined by the existence of narrow isthmuses. Thus the New World is divided into North and South America, and the Old World into Eurasia and Africa. The further subdivision of Eurasia into Asia and Europe, though very ancient, is based on an entirely different principle, and has no morphological justification. The first divisions of the ocean are determined by the manner in which they are bordered and broken up by the land-masses.

Other topographical divisions of the land are based on the character of the surface relief—that is, of the level areas or plains, of the higher but relatively flat tablelands, the more irregular hilly uplands and high-

lands, and the still more complex and irregular mountains. Each of these types of relief can be analysed much further. A mountainous area or system, for example, can be subdivided into mountain chains with intermediate plateaus or valleys. The mountain chains are composed of ranges, or series of ridges, and of systems of valleys. These again, in their turn, can be analysed into their constituent ridges and valleys. Thus several orders of form can be distinguished in a mountain region, and similar orders could be made out for the highlands, tablelands, and plains.

From a geographical point of view the atmosphere is as important as the land, but it cannot be subdivided in terms of visible form. For subdivision its physical properties—temperature, pressure, movement, and their variations—must be selected. Climatic divisions and subdivisions are almost as easy to recognise and delimit as orographical. Temperature belts and regions of different rainfall afford a basis for the classification of climates.

Temperature, salinity, and movement are the chief factors to be considered in attempting to subdivide the surface of the ocean into regions, except in those seas which border the lands and are defined by them.

While it is convenient to analyse these different sets of conditions separately, it must always be remembered that the isolation of any one set is quite artificial. The various phenomena do not take place separately, but together, and the effect of the several causes acting together, or of the several groups of phenomena being produced simultaneously, is not to be arrived at by a mere process of simple addition. A scientific geographical analysis must deal simultaneously with the atmospheric conditions, and with one at least of the other two factors—the land and oceanic conditions. The task of the geographer is thus extremely

complex, and at first sight it would appear as though much of his energy must be unprofitably dispersed in the study of an infinite variety of particular cases. Any method which helps him to group his instances will immensely facilitate the scientific investigation of his subject.

The Regional Method.—The progress of science is twofold. It consists, in the first place, in removing more and more things out of the category of the accidental into that of the causal, and, in the second place, in bringing phenomena into larger and larger groupings. In the first sense geography has long been scientific; in the latter it is still largely empirical. The analogy of other branches of science suggests that geography will also become not merely more microscopic in its analysis of the smaller units, but more macroscopic in its co-ordination of the larger units.

Here a comparison with botany may be useful. The older scientific botanists based their work on such purely intellectual conceptions as genera and species. The younger botanists prefer to analyse the concrete plant associations, and to compare different types of plant associations with each other. What the plant association is to the botanist the natural region is to the geographer. There is a definite topographical continuity in a geographical or natural region which connects all its parts and controls and modifies all its processes. This gives it a real and concrete unity as distinguished from one that is primarily intellectual and abstract. It cannot be too clearly understood that the Earth's surface is made up of such concrete geographical regions, that each has its own recognisable characteristics, and that it is possible to classify the various concrete regions under different types in the same way that the concrete plants or animals can be classified.

Natural Regions.—On the lowlands the different

natural regions are most easily determined by difference of vegetation. Here, where the topographical conditions are relatively constant, the difference in vegetation is the visible expression of the variation of the influences of soil and climate, and serves as its measure. In the case of the North American plains, for instance, this is a far more valuable criterion than the rather indefinite 'divides' between river basin and river basin, or the still less significant political boundaries. In mountainous regions, where there is a vertical succession of climates and different types of vegetation are consequently brought into juxtaposition, relief must be taken into account as the determining factor, especially in the case of mountain systems which run parallel to the lines of latitude—that is, from east to west. When mountain systems cross parallels of latitude the vegetation of the base still affords the best index to the major natural division in which that part of the system is to be included. Broadly speaking, climatic conditions (*i.e.* dynamic or physiological considerations) determine the larger divisions; topographical conditions (morphological considerations) determine the smaller.

The Major Natural Regions.—It is convenient to divide the World into some sixty or seventy major natural regions. The considerations which have led to the adoption of these natural regions are too numerous and complicated to be discussed here. They are analysed in a paper on the Major Natural Regions published in the 'Geographical Journal' 1905. These major natural regions can be grouped into fourteen types. The following table shows the types, and the map the distribution of each type :

1. Polar—
   (*a*) lowlands, or Tundra type ;
   (*b*) highlands, or Ice-cap type.

2. Cool Temperate—
    (*a*) western margin, or West European type ;
    (*b*) eastern margin, or Laurentian type ;
    (*c*) interior lowlands, or Siberian type ;
    (*d*) interior highlands, or Altai type.
3. Warm Temperate—
    (*a*) western margin, or Mediterranean type ;
    (*b*) eastern margin, or China type ;
    (*c*) interior lowlands, or Turan type ;
    (*d*) plateau, or Iran type.
4. The Hot Lands—
    (*a*) western desert, or Sahara type ;
    (*b*) summer rain, Monsoon or Sudan type ;
    (*c*) equatorial lowland, or Amazon type ;
    (*d*) lofty plateau, or Bolivian type.

Space forbids a detailed analysis of these major natural regions, but those of the West European major natural region may be given. This region is composed of the minor natural regions of (1) Scandinavia ; (2) the region which borders the North Sea on the south-east from Jutland to the Rhine delta ; (3) the British Archipelago ; (4) France ; (5) the North Iberian region. Each of these minor natural regions is composed of a number of regions. Thus Great Britain consists of the regions of (1) the highlands and islands of Scotland ; (2) the central Scottish lowlands ; (3) the central uplands of Great Britain ; (4) the Welsh highlands ; (5) the Cornwall-Devon peninsula ; and (6) the east central and southern plains and heights of England. These regions can each in turn be analysed into various sub-regions, each composed of different districts. We have in the above example passed through five different orders of geographical subdivision. In each of these, no matter what its order, the geographer has to consider (1) the characteristics of the region, its general type of con-

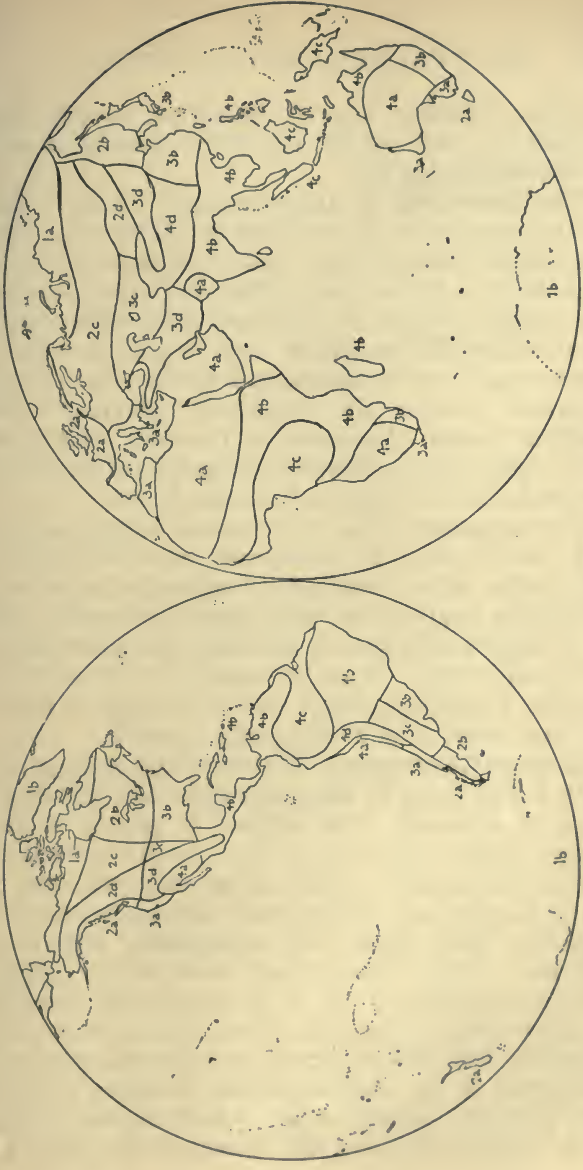

FIG. 1.—MAP OF NATURAL REGIONS[1]

[1] These illustrations are taken from the 'Oxford Geographies,' Preliminary, Junior and Senior, by permission of the Delegates of the Oxford University Press.

figuration, climate, natural vegetation, people and occupations; and (2) the connexion between it and the surrounding regions.

The Recording of Geographical Facts.—The difficulties which are encountered in dealing with vast areas, all of which no man could ever hope to see in detail, have to be overcome. The geographer requires some special method of presenting geographical facts in an accurate and intelligible way. He has invented a notation which can be made as exact as the observations it records, and is also remarkably graphic. This admirable system of notation is the map, which presents a generalised reduction of geographical facts in a form which can be easily read and interpreted.

The topographical map is the basis of all geographical work. On it may be superposed representations of such visible features as relief and vegetation, or of such less obvious conditions as temperature and winds. The use of maps is necessary in teaching, and more will be said about it later. Maps are essential in the study of scientific geography, which has made rapid progress only since maps of all kinds became available.

Modern Geography.—The conception of geography which is still found in many syllabuses and text-books is very inadequate. The subject is treated in two distinct parts. The first consists of the outlines of general physiography, within limits which are more or less arbitrarily set. There is an analysis of the properties of land, water, and atmosphere, with some reference to their distribution and to the general climatic conditions. This is commonly supplemented by an account of the chief floral, faunal, and racial divisions. The second part is generally devoted to a description of the various political divisions and, for more advanced pupils, of the administrative subdivisions. Thus the point of view of the geologist, physicist,

biologist, and anthropologist are successively taken up, and a separate analysis is made of each of the conventional political divisions. Modern geography aims rather at studying the surface of the Earth from the point of view of the natural divisions or regions of different orders of which it is made up, the characteristics of each of these and its relation to others, and the classification of these natural regions into types.

The Introduction to Geography.—Geography being an observational science, a course of Nature-study lessons forms an admirable, and it may even be said an essential, preliminary to its study. The observations on day and night, on the phenomena of weather, the characteristics of soil, and the facts of plant life, all provide necessary knowledge for future geographical lessons. Measurements, plans, and sections will also generally be taught in the Nature-study course, but should be introduced with considerable discretion. Observation should everywhere precede measurement, and the writer believes that rough attempts to draw and paint the landscape should precede actual map-making. Map-reading, however, if ordinary discretion is used, may be introduced at a comparatively early stage, for most children can understand maps long before they can draw them with any approach to accuracy. All children will enjoy painting the local sheets of the 6-inch or 25-inch map, the woods, cultivated lands, roads, railways, &c., being appropriately coloured.

Home Geography.—Most teachers agree that the first geography to be taught should be that of the home district. It should also be the last. Home geography is not necessarily easy. That is not the reason for beginning with it. It has the supreme advantage of being that which can be learned at first hand. This involves work out of doors, whether in town or country. If a headmaster cannot plan the work of his school so

as to allow a reasonable number of occasions for this work, he is not fit to be a headmaster. A greater difficulty presents itself in the proper use of the time out of doors. This time is wanted not merely for local geography, but also for Nature study. Systematic home geography (Heimatsgeographie) must be preceded by general home lore or local Nature study (Heimatkunde), of which it forms one of the more difficult parts. The geographical work comes in when the local phenomena are looked at as forming a whole. Probably the difficulty of this geographical outlook, of seeing a landscape and being able to read its salient features, is exaggerated. There is some reason to suppose that it varies inversely with the time a child has been at school. The school habit of looking at nothing but print and pictures requires constant correction, and nothing affords this so well as out-of-door work. This trains the eye to see the greater units, the woods as well as the trees, the valley and its river as a single whole, the quarters of a great city as well as its houses.

Whilst it is essential that this geographical point of view should be given, it is not necessary that the teacher should draw nice distinctions between what is geographical and what is not. The distinction between home lore and home geography is here made, not to urge their separate treatment, but to insist on the geographical aspects of the home district, which are too commonly neglected, being properly treated. It is not enough to name the rivers and hills, to know on which river and in which county a town or village is. Names are useful, but it must never be forgotten that we do not necessarily know more about a thing when we have named it than we did before. The special value of the study of local phenomena is that it is not primarily verbal, and that it associates real impressions with particular words.

The home region presents two aspects. It is in many respects typical of the World as a whole. In others it is sharply differentiated from other parts of the World. Neither the generic, the specific, or the individual aspect is to be neglected.

One fundamental idea to grasp, one that should be kept in view throughout the whole geographical course, is that of the Earth in movement. At first, naturally, this can be understood only in a very limited degree. Still, no child of school age is too young to notice the daily alternation of night and day, the most dramatic and far-reaching of world phenomena. The waning of daylight in winter and its waxing in summer can early be observed and recorded. It is more important to bring out what this means to plant and animal life than to attempt elaborate astronomical explanations. Still, from the beginning, if only to stimulate the young pupil's responsive imagination, it should always be borne in mind that our rising Sun is shedding its last beams on watchers in the east, and that it sinks from our sight to rise over the eastern horizon of watchers in the west.

A similar set of observations supply the first concrete basis for understanding the more complicated and less obvious phenomenon of revolution, and of the sequence of the seasons. As before, attention should be devoted primarily to the observation of these in relation to human life. Astronomical explanations will come in due course, and with far greater validity when the phenomena are thoroughly understood on the concrete side.

From these two sets of observations are derived the first simple notions of position in time and space. The directions of the rising and setting Sun give the first ideas of east and west. The position of the Sun at noonday should be regularly observed. Children should be made to find the cardinal points of the compass from

the shadow of a stick at noon. With very little practice they learn to orient themselves sufficiently for many practical purposes, and to form an approximate idea of the time of day from the direction of the shadow and the height of the Sun in the heavens. Questions of latitude and longitude should not be treated till a much later period.

It is not to be assumed that these observations are to be carried out previous to, and independently of, all others. In the nature of things this could not be, even if it were in itself desirable. The seasonal observations are to be correlated especially with those on rainfall and on plant life. A few minutes should be devoted daily to record the prevailing wind, the general character of the weather, and perhaps also the temperature and barometric pressure. If the school possesses a raingauge so much the better. The first correlations to be made are those between prevailing wind and rainfall, and between these and the seasons. These, again, are to be associated with observations on plant life. The latter will gradually widen from the simple act of noticing what trees and flowers are coming into leaf in the immediate neighbourhood of the school, to systematic investigations into the vegetation of the region as a whole.

The observation of rainfall suggests a natural introduction to the study of land forms. After a heavy rain the road offers opportunities for field work of a varied and fascinating description. The slope is sufficient for the essential characteristics of rivers, tributaries, river basins, and divides to be clearly seen. These minute rivers, which carry their tiny loads of sediment from the higher part of the road and deposit it where the slope is gentle, illustrate the work of denudation on a small scale. The same road, if visited soon after the rain has run off, will

often be found to retain the miniature valleys incised by these streams, and the arrangement of these will be very instructive. The lessons learned in the road can then be restudied in greater detail in suitable parts of the home region. If the school be in a hilly region the destructive work of rivers will be very obvious. If it is in the plain more will be seen of their constructive work. Thus, gradually a concrete idea will be formed of the part which water has played in sculpturing the surface of the earth and rendering it habitable.

The study of the wet highroad and its rivers forms a very easy introduction to mapping. Let children draw one of the miniature rivers and its tributaries. Their drawings may then be compared with the representation of any typical river—say, the Yorkshire Ouse or the Mississippi—in an ordinary map. This is a much more interesting and intelligible exercise than setting to work to measure and draw to scale a classroom or a playground. Scale and other complexities of the graphic method will come in due course. The essential thing is to accustom pupils to use a graphic method of recording facts, no matter how roughly at first.

Another important matter is to obtain clear ideas of relief and some skill in representing it. The study of the road will have shown how even slight inequalities of surface may determine the courses of the rivers of a region. A cartload or two of sand in the playground can be heaped into many shapes, and will provide materials for simple exercises in contouring and in reading the home-made contoured maps. With older pupils the contoured ordnance survey maps will play a great part in the geographical work. The teacher, however, must see that these maps are constantly used in the field, that the abstractions of the map may be correlated with the concrete differences of relief. This

will involve a considerable expenditure of time and trouble, but will repay it in the end. The contoured map of an unknown region is to the trained geographer what the score of a new piece of music is to the musician. The one can hear the melody, the other can see the broad features of the country.

Many other typical characteristics can well be studied in the home region. Among the more important are the agencies of sub-aerial weathering, and such relations as those between geological structure and soil, between soil and vegetation, between exposure and vegetation, &c. Little and often is a good motto. A small area frequently visited and intimately known comes at last to be understood as a whole. In geography, as in other things, it is a surer sign of education to discover more and more in the familiar than to be impressed chiefly by the unfamiliar.

Only a few words can be said of the study of the home region in its individual aspect. This will vary greatly with the character of the region—urban or rural, maritime or inland. The fields and what they contain; the roads, their relation to the local relief, and the places to which they lead; the methods of transport; the contents of cart, boat, canal barge, railway truck, or ocean-going steamer—all these throw light on the physical and economic peculiarities of the region. As this study becomes more exhaustive the relation of the home district to the larger world beyond becomes clearer. The cotton-fields of the Southern United States are discerned on the horizon of Liverpool. All roads lead to London and out to the ocean highways. The home region is the portal through which we enter the World.

Beginnings of World Geography.—Obvious as are the advantages of approaching the systematic teaching of geography by way of the home region, there is

also much to be said, from an educational point of view, for another method of approach. The home region is frequently highly complex, and a simpler region, though geographically more remote, may be more easily understood. For this reason the present writer, in his recently published ' Preliminary Geography,' preferred to begin with North America, where both physical features and economic conditions are exhibited in a comparatively simple manner. In using this method great recourse must necessarily be had to pictures, and it is a matter for regret that the supply of suitable material is far from adequate—at least, so far as our own country is concerned. Well-chosen descriptions are also very useful. Stories of other lands and other peoples, if properly told, appeal strongly to children, especially if illustrated by pictures of the actual conditions described. The story of Eskimo life and the dramatic manner in which it is controlled by Arctic conditions; of desert life, with its many points of contact with the sacred story; of the steppe-dwellers, with their wandering herds and mobile tent; of the Swiss herdsmen of the Upper Alps; of the fishermen of Norway or Southern Chile; of the hunting dwarfs of the African forests; all these, if the influence of environment is clearly and persistently brought out, not merely interest children during the brief course of a particular lesson, but remove one study at least from that over-full class which deals not with real things, but with the names of things. Everyone remembers the surprise of Tom Tulliver at the idea that there were once real people who really used Latin in their every-day life. What is hard for the teacher of Latin should be a simple matter for the teacher of geography. Such lessons should, of course, be carefully correlated with the use of a simple globe, which for most children is a far less difficult abstraction than the flat map. For young children at

least there would be both pleasure and profit in embodying the content of such a course of lessons in a series of geographical pictures of their own making. How educationally valuable such a collection might become will be realised by all those who have read Professor Geddes's description of such a series in his recently published book on Dunfermline. The passage is one which every teacher of geography should read, whether he proposes to adopt the method or not.

Teaching Older Children.—In more advanced classes more work can be given to the pupils to do for themselves. The map and map-reading will become more and more important. One of the chief differences between elementary and advanced geographical work is that in the latter the map is made the basis of systematic study, with pictures and descriptions as illustrations; while in the former the lessons are based on pictures and descriptions, and the map is used for illustration and reference.

Familiarity with maps of all kinds should be first acquired; and gradually, as the pupil becomes ready for them, explanations of the methods of map-making may be added. The Ordnance Survey maps of the district must be studied until they can easily be read, and the character of the region clearly understood from them. Special editions of many ordnance maps can now be obtained so cheaply that every child should have a copy of either the 1-inch or the 6-inch sheet, and preferably of both. A complete set of local sheets of the different types of ordnance and geological survey maps, and of the reductions of the survey maps by Bartholomew, Philip, and Johnston, the $\frac{1}{2}$-inch ordnance map, and Bartholomew's survey contoured maps without the black printing, should be hung in every schoolroom, and the children should be encouraged to examine them constantly. If circles with a radius of one or two miles

were drawn round the position of the school on each sheet of the map, it would give rise to many comparisons, and would familiarise children with different scales, and the amount of detail which can be shown with each.

Map making should, of course, be encouraged. The local plant and animal associations studied in the biological lessons of the Nature-study course may profitably be mapped. Similarly the physics lessons may occasionally be utilised for such purposes as determining the sun's altitude, and for calculating elevation by observations of the barometer or of the boiling-point thermometer. In the higher forms a class studying trigonometry might attempt simple problems in triangulation, the measurement of heights, estimations of the width of rivers, or distances in the fields, and these results can be embodied in a plan or map.

Map Reading.—Having been trained to use the orographical map as the basis of the detailed study of the home region, the pupil will find it a matter of no great difficulty to read the orographical map of an unknown region. The general shape of the land, the character of the highlands and lowlands, the general arrangement of these and their relation to the river systems, should first be mastered. The teacher should be able to generalise these, and to express them in simple diagrams on the blackboard, drawn in the presence of the class as the lesson proceeds. By this time some practice will have been gained by pupils in reading the map as a record of actual rivers, mountains, &c., but to give further practice in interpreting the abstractions of the map it is still very necessary to show well-chosen pictures of the region in question. In these, attention should be directed not merely to physical features, but also to the characteristic vegetation, and to any examples of human occupation, as well as to illustrations of types of dwelling, implements, &c.,

most of which are very definitely related to the geographical conditions. Further colour and life may be added by well-chosen travellers' descriptions. From such pictures and descriptions some broad generalisations may often be made as to climate, and the exercise is a profitable one provided that these are very carefully checked by reference to climate—vegetation—and other maps.

Map Exercises.—Given the orographical map, the latitude and general position of a region with relation to sea and land, it should be possible in the case of older pupils to deduce the salient characteristics of the climate and vegetation. This kind of exercise fascinates many pupils, as well as the converse one of discovering in what part of the globe a place is to be found for which the seasonal temperature and rainfall are given. Exercises of this type, in which the answer can be tested, are much more profitable than those of the 'If so-and-so were not the case what would have been?' type, and of other questions equally imaginative.

Measurements of all kinds, but especially of areas, should be made on maps for purposes of comparison. Thus the area of the Sahara desert of Africa might be measured and compared with the area receiving heavy rain at all seasons. The maps employed must of course be constructed on equivalent or equal area projections.

The measurements of areas can be made in a number of ways. One of the simplest, in the case of large areas, is to calculate the area of a mesh of the network of parallels and meridians between different parallels. For example, if the area of the Sahara is to be estimated it will be found, by using an ordinary atlas, counting the complete meshes and estimating the proportion of each incomplete mesh, that there are a little over three and a half complete meshes between 10° and 20°, about five complete meshes between 20° and 30°, and

one and a quarter between 30° and 40°. 1° N—S equals 69 miles, or, roughly, 70 miles. It is more difficult to remember the value of 1° E—W, which varies at different latitudes. A simple rule of thumb is given in the following table :

At	0°	of latitude	1°	longitude is	69 miles		
,,	10°	,,	1°	,,	$69-1^2$ miles	= 68	miles
,,	20°	,,	1°	,,	$69-2^2$,,	= 65	,,
,,	30°	,,	1°	,,	$69-3^2$,,	= 60	,,
,,	40°	,,	1°	,,	$69-4^2$,,	= 53	,,
,,	50°	,,	1°	,,	$69-5^2$,,	= 44	,,

At 60° the length is just half that at the equator, or $34\frac{1}{2}$ miles. At 70° it is one-third, or 23 miles ; at 80° it is one-sixth, or $11\frac{1}{2}$ miles.

Hence the area of a mesh between 10° and 20° is roughly 10×69 miles $\times (10 \times 68 + 10 \times 65) \div 2$ miles $=$ 690 miles $\times$ 665 miles $=$ 458,850 square miles.

The area between 20° and 30° is $690 \times 625 = 431,250$ square miles, and that between 30° and 40° is $690 \times 565 = 389,850$ square miles.

Knowing these values we can find the approximate area of the Sahara as

$3\frac{1}{2} \times 458,850 =$	1,476,550	square	miles.
$5 \times 431,250 =$	2,156,250	,,	,,
$1\frac{1}{4} \times 389,850 =$	487,310	,,	,,
	4,120,110	,,	,,

It must be pointed out that in such rough calculations the figures in the last four or five places should not be taken into account, and that 4,125,000 square miles, or even a little over 4,000,000 square miles, is a sufficiently accurate answer, especially as the limits of the Sahara are not clearly defined.

Another method of measuring areas is by using tracing-paper ruled in very small squares, say, one-tenth inch in the side, or by drawing the area to be

measured on ordinary tracing-paper and superimposing this tracing on squared paper. If the number of squares which make up the area enclosed are counted, the calculation is very simple. Suppose there are 1,005 squares, each with a side 0.1 inch long. This gives an area of 10.05 square inches. Suppose the scale of the map is $1 : 40{,}000{,}000 = 1 : 4 \times 10^7$. As this scale is

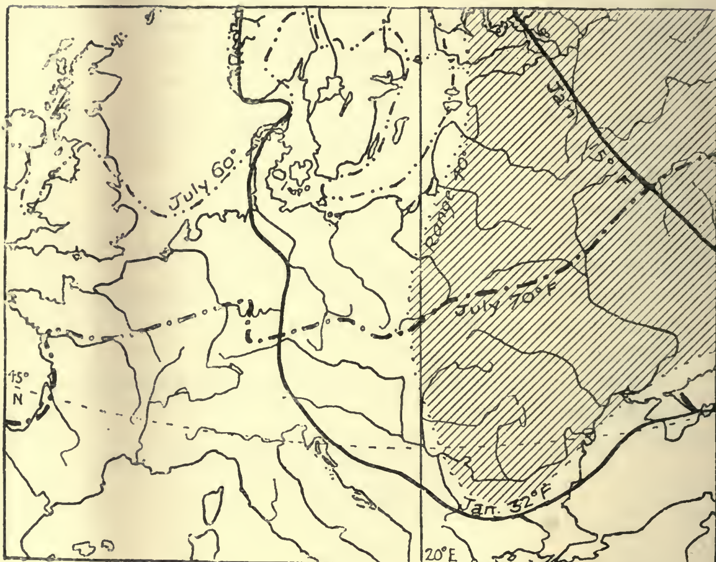

FIG. 2.

linear we must multiply by the square to get the true area—that is to say, by 16×10^{14} square inches. Now there are 63,360 inches in a mile. Consequently the area represented by 10.05 square inches is $\frac{10.05 \times 16 \times 10^{14}}{63{,}360 \times 63{,}360}$ square miles $=4{,}005{,}500$ square miles nearly, or approximately 4,000,000 square miles.[1]

[1] The complications introduced into such calculations by our cum-

Simplified topographical maps, which purposely exaggerate a little the peculiarities of a country, should constantly be drawn, and the pupils should be trained to construct them from the complex map.

Synthetic climatic maps may be made by selecting special lines from the ordinary climatic maps. This is a very important type of exercise. The ordinary meteorological maps contain too many lines. The geographer wishes to select only a few of the more significant. A simple diagram will make this clearer. Fig. 2 shows the isotherms reduced to sea-level, 15° and 32° F. being taken for January, and 60° and 70° F. for July. From this the contrast between the low range of temperature of the west and south, and of the great range of temperature of the centre, east, and north-east can be seen at a glance. The range of temperature over the North Sea is under 30°, that over the Baltic is over 30°, while that of the small triangular area in the extreme east of the map is over 55°. The area with a range of over 40° is shown by shading.

Another good type of synthetic climate map is shown in figs. 3 and 4, where the regions of heavy, and of little or no rainfall over the land are distinguished, and the winds over the ocean for the same seasons are shown. Opposite seasons of the year are illustrated on the two maps, and it is obvious that very vivid and valuable lessons can be given from such simple diagrams.

Statistical maps and diagrams should also be made. The use of such Blue-books as the Agricultural Returns for Great Britain, and also those from Ireland should be encouraged. The accompanying diagram (fig. 5) shows the result of calculating from these the propor-

brous system of measures are very clearly shown by these illustrations. If the metric system is employed they become quite simple. 1 : 40,000,000 then means that each millimetre (mm.) represents 40 kilometres (km.). Thus 1 sq. mm. represents 1,600 sq. km.

tion of arable land per 1,000 acres for each county, entering the figures on the map, and then shading the counties according to the acreage. Such maps should be compared with the orographical, climate, and soil maps of the same area. These methods are valuable not merely to the geographer but to the business man, and they can be simply and effectively introduced into the geographical course.

FIG. 3.—WINDS AND RAINY REGIONS IN JANUARY.

School Excursions.—Much has been written about the school excursion. Its strongest opponents are those who have not tried it; its most enthusiastic advocates are those who have been successful in carrying it out and utilising it. In towns it is more difficult to manage than in the country, where there is now no excuse for its neglect. The writer last year met a class of elemen-

tary schoolboys with their teacher on the top of the Cotswolds. This master had taken the first opportunity after the New Code came into operation to take them out, and the way in which the boys answered questions about what was to be seen was most encouraging. Even in cities, where electric tramways usually run to the margin of the open country, it should not be difficult to manage matters.

There are two plans of setting to work. One is to

FIG. 4.—WINDS AND RAINY REGIONS IN JULY.

tell the child nothing beforehand, and to allow him to discover everything for himself. This may succeed with a few bright children, but with an average class it is much safer to adopt the other plan, and give one or more lessons on the ground to be traversed, so that the pupils have some idea of what they have to look for. The art of seeing geographically is not learned in

a day, and requires patient effort at first. Most children need all the help they can get at the beginning.

Field Work.—The field work that should be done on the excursion must obviously vary within fairly wide limits according to the character of the surrounding country, the age and knowledge of the class, and the special equipment of the teacher. The constant reading of large-scale maps in the field is of course essential. The commoner types of land forms, the work of rivers,

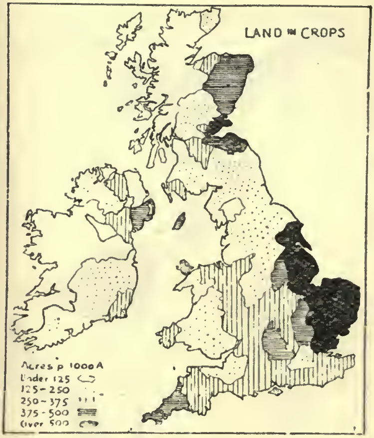

FIG. 5.

the effects of weathering, the distribution of local rocks, their relation to water supply, vegetation and settlement, the distribution of wild and cultivated vegetation and its relation to elevation and exposure, the various occupations and their relation to any of the preceding, are all profitable subjects for field study. Other hints will be found in the section dealing with Home Geography.

Class-room Equipment.—Wall-maps, with the exception of those showing winds and currents, should all

be on an equal area (equivalent) projection, and it is convenient to have the whole or part of the British Isles shown on the same scale for purposes of comparison.

The collection of Ordnance Survey and other maps on which the local topography is shown is essential.

In response to memorials addressed in 1903 to the Board of Agriculture by the Geographical Association and others, the Board have issued the following regulations. Any public educational authority or recognised school may order special editions of sheets of the (*a*) 6 inches to 1 mile, (*b*) 1 inch to 1 mile, (*c*) 4 miles to 1 inch, (*d*) 10 miles to 1 inch maps, which will be printed on cheap but reasonably strong paper, and supplied at the following rates, provided that a guarantee is given that the maps will be used only for teaching purposes and will not be sold :

SHEETS UP TO 18 × 12 INCHES.

Copies	Ordinary 1-inch Sheet		Sheets made up of two or more Ordnance Survey Sheets	
	Outline alone	Outline and hill shading	Outline alone	Outline and hill shading
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
200	1 5 0	1 15 0	2 5 0	3 15 0
500	2 0 0	2 15 0	3 0 0	4 15 0
1,000	3 0 0	4 0 0	4 0 0	6 0 0
5,000	12 0 0	16 10 0	13 0 0	18 10 0
SHEETS UP TO 18 × 24 INCHES.				
200	1 12 6	3 0 0	3 2 6	6 0 0
500	2 7 6	4 4 0	3 17 6	7 5 0
1,000	3 7 6	5 12 0	4 17 6	8 12 0
5,000	12 7 6	18 15 0	13 17 6	21 15 0

For 6-inch sheets water coloured the prices will be 5*s*. more than those given in the table for hill-shaded sheets.

Private schools applying for special editions should

send a copy of their prospectus. Special regulations may be drawn up for such schools. All orders should be addressed to the Director-General, Ordnance Survey, Southampton.

A lantern is practically essential, and a good selection of slides to be used with it. The wall-maps can be supplemented by the numerous slide-maps of the Diagram Company, West Barnes Lane, New Malden, Surrey. The Geographical Association is now making arrangements for the preparation of slides which do really illustrate geographical conditions, and these will soon be on the market. These, when ready, will save the teacher much trouble. Particulars as to the cost of lanterns and the necessary adjuncts are given in the 'Geographical Teacher,' Summer Number, 1907.

Most teachers have to manage with a very small allowance for apparatus, and few can obtain what might reasonably be considered as a minimum equipment. It is true that a good teacher can work wonders with a black globe, a blackboard, and coloured chalks, but he could do far more with a better equipment, and a good workman should not be grudged adequate tools.

The large blackboard and the black globe are a *sine qua non*. The first additions to this simple outfit should be a large globe with bathy-orographical colouring, and orographical maps of the World without any names inserted. Similar orographical maps of each continent and of the British Isles are required. Not till these are secured should there be orographical maps with names and possibly political divisions. The ordinary politically coloured map should be a luxury for wealthy schools, and not the stock in trade of the ordinary school. Before it is bought, maps of rainfall, rain seasons, wind, temperature, currents, vegetation, occupations, and density of population should have been purchased. These, for the World at least, should

be in every school, as well as large maps of Western and Central Europe, the Mediterranean, Palestine, India, East Asia, and Australia. New Zealand, South Africa, West India, South Canada, and the United States should be added when possible.

A few models are desirable, but it is difficult to obtain good ones at reasonable prices. Moreover, the space taken up by models is very great. Models of the local district and of such regions as South-East England, the Lake District, the Alps, a glacier, a volcano, a coral island, and the Harvard models of coastal forms, are among the most valuable. In most models the vertical scale is unduly exaggerated, and very false ideas may be derived from it. The construction of models by pupils is a useful enough exercise where carpentry is taught, and should be encouraged. A collection of large scale maps, selected to show types of topography in special regions, should be made in High Schools.

Geographical Library.—A small library of geographical books, illustrated if possible, should be in every school library, and should be freely used for reference. Mr. Unstead, Lecturer in Geography in the Goldsmiths' College, has recently drawn up the following list of books as suitable for this purpose. His article will appear in the autumn number of the 'Geographical Teacher,' 1907.

GENERAL GEOGRAPHY.

	Stanford's Compendium of Geography (Stanford) :—	*Published price.*	*Approximate net cost.*
(m)	Chisholm, G. G., Europe, Vol. I. .	15*s.*	11*s.* 3*d.*
(s)	,, ,, ,, Vol. II. .	,,	,,
(m)	Dawson, S. E., North America, Vol. I.	,,	,,
(m)	Gannett, H., ,, ,, Vol. II.	,,	,,
(m)	Gregory, J. W., Australasia, Vol. I. .	,,	,,
(m)	Guillemard, F. H., ,, Vol. II. .	,,	,,
(m)	Keane, A. H., Asia, Vols. I. and II. .	,, (each)	22*s.* 6*d.*
(m)	,, ,, Africa ,, ,, .	,, ,,	,,
(m)	,, ,, Central and S. America, Vols. I. and II.	,, ,,	,,

The Regions of the World Series (Oxford Press) :—	*Published price.*	*Approximate net cost.*
(l) Hogarth, D. G., The Nearer East .	7*s.* 6*d.* net	7*s.* 6*d.*
(m) Holdich, T., India	,,	,,
(l) Little, A., The Far East . . .	,,	,,
(s) Mackinder, H. J., Britain and the British Seas (2nd edition) . . .	,,	,,
(m) Partsch, J., Central Europe . . .	,,	,,
(l) Russell, I., North America . . .	,,	,,
Descriptive Geographies Series :—		
(s) Herbertson, A. J. and F. D., Europe, Asia, Australasia, Africa, N. America, Central and S. America (Black) .	2*s.* 6*d.* each	11*s.* 3*d.*
(s) *Geographical Teacher*, Vols. I.–III. (Philip) . . . . . (bound)	1*l.* 2*s.* 6*d.*	1*l.* 2*s.* 6*d.*
(m) Brehm, From North Pole to Equator (Blackie)	(secondhand, about) 6*s.*	
(l) Heilprin, A. and L., New Gazetteer (Lippincott)	2*l.* 2*s.*	2*l.* 2*s.*
(m) Hope Moncrieff, A. R., The World of To-day, 6 vols. (Gresham Publishing Co.)	2*l.* 8*s.*	2*l.* 8*s.*
(m) Keltie, J. S., Statesman's Year Book (Macmillan)	10*s.* 6*d.* net	10*s.* 6*d.*
(s) Mill, H. R., International Geography (Newnes)	15*s.* net	15*s.* 0*d.*

ATLASES.

(m) Bartholomew, J., Atlas of Meteorology (Bartholomew)	2*l.* 12*s.* 6*d.* net	2*l.* 12*s.* 6*d.*
(s) Bartholomew, J., Atlas of the World's Commerce (Newnes)	15*s.* (about)	15*s.*
(m) Bartholomew, J., XXth Century Citizen's Atlas (Newnes).	1*l.* 1*s.* net	1*l.* 1*s.*
(l) Berghaus, Physikalischer Atlas (Perthes, Gotha)	4*l.* 2*s.*	4*l.* 2*s.*
(s) Ravenstein, Systematic Atlas (Philip) .	15*s.*	11*s.* 3*d.*
(s) Stieler, Hand-Atlas (Perthes, Gotha) .	1*l.* 18*s.*	1*l.* 18*s.*

PHYSICAL AND BIO-GEOGRAPHY.

(m) Beddard, F. E., Text-book of Zoo-Geography (Cambridge Press) . .	6*s.*	4*s.* 6*d.*
(s) Davis, W. M., Elementary Meteorology (Ginn)	10*s.* 6*d.*	7*s.* 4*d.*
(s) Davis, W. M., Elementary Physical Geography (Ginn)	5*s.* 6*d.*	4*s.* 2*d.*
(s) Dryer, C., Lessons in Physical Geography (American Book Co.) . .	6*s.* (about)	6*s.*
(s) Gilbert, G. K., and Brigham, A. P., Introduction to Physical Geography (Appleton).	5*s.* net	5*s.*
(l) Hann, J. (trn.), Handbook of Climatology, Part I. (Macmillan) . .	12*s.* 6*d.* net	12*s.* 6*d.*

	Published price.	Approximate net cost.
(s) Huxley, T. H., and Gregory, R. A., Physiography (Macmillan) . .	4s. 6d.	3s. 5d.
(s) Mill, H. R., Realm of Nature (Murray)	5s.	3s. 9d.
(l) Schimper (trn.), Plant Geography on a Physiological Basis (Oxford Press) .	2l. 2s. net	2l. 2s.
(l) Suess, E. (trn.), The Face of the Earth, Vols. I.–III. (Oxford Press) . .	3l. 15s. net	3l. 15s.

HUMAN GEOGRAPHY.

(m) Adams, C. C., Text-book of Commercial Geography (Appleton) . .	5s. net	5s.
(s) Chisholm, G. G., Hand-book of Commercial Geography (Longmans) .	15s. net	15s.
(m) George, H., The Relations of Geography and History (Oxford Press) .	4s. 6d.	3s. 4d.
(s) Haddon, A. C., The Study of Man (Murray)	6s. net	6s.
(s) Herbertson, A. J. and F. D., Man and his Work (Black)	1s. 6d.	1s. 2d.
(l) Keane, A. H., Ethnology (Camb. Press)	10s. 6d.	7s. 11d.

SCHOOL BOOKS

(ILLUSTRATIVE OF MODERN METHODS OF TEACHING).

(s) Dodge, R. E., Elementary and Advanced Geographies (Rand, McNally & Co.)	$1.85	(about) 7s. 6d.
(s) L'Estrange, P. H., A Progressive Course in Comparative Geography (Philip)	6s. net	6s.
(s) Lyde, L. W., The World (Black) .	3s. 6d.	2s. 8d.
(s) Herbertson, A. J., The Oxford Geographies, Vols. I.–III. (Oxford Press)	6s. (about)	4s. 6d.
(s) Mackinder, H. J., Studies in Geography: Part I., Our Own Islands (Philip)	2s. 6d.	1s. 11d.
(s) Reynolds, J. B., British Isles, Europe (Black)	2s. (each)	3s.
(s) Reynolds, J. B., World Pictures (Black)	2s.	1s. 6d.
(s) Simmons, A. T., and Richardson, H., Introduction to Practical Geography (Macmillan)	3s. 6d.	2s. 8d.
(s) Tarr, R. S., and McMurry, F. M., Geography in Three Books . . .	12s. 6d.	9s. 4d.

The books marked (s) will probably be found sufficient for the needs of teachers who have the less advanced classes. Teachers who have to make a more thorough study will find the books marked (m) useful, and those works marked (l) are generally more expensive and of a still more advanced character.

If the books marked (s) are alone obtained the net cost of this 'small' library will be about £11; if with these books those marked (m) are also included, the 'medium' library will be formed at a cost of about £22; if the books marked (l) are added, the total cost of the 'large' library will be about £36.

Many of these are well illustrated, and their pictures, &c., can be shown to a small class. For the larger classes of elementary schools lantern-slides or large-size wall-pictures are the most convenient methods of showing views.

In the section on senior work in schools further references will be found. A full account of the books, apparatus, &c., useful in the teaching of geography is given in Dr. H. R. Mill's 'Aids to Teachers,' a second edition of which will be published by the Geographical Association early in 1908.

Home-made Diagrams.—While it is desirable to have as many aids to teaching as a school can afford to purchase, it is equally desirable to add many that can be made by teacher or pupil. Wall-maps can be made cheaply at home. The coast and rivers of each continent and of selected countries should be traced in indelible ink on tracing-paper or cloth. It is easy to get outlines for a wall-map by covering cartridge paper cut to the proper size with typewriting carbon papers, putting the tracing on the top, and going firmly over the lines on the tracing, which are thus transferred to the cartridge paper. On the outline map thus obtained anything wanted—physical, biological, economic, historical—can be drawn or coloured. A slip of calico about three inches wide should be pasted round the margins of the paper to prevent tearing.

A cheap stand for maps can be made of three bamboo rods eight to ten feet long, costing 3*d.* or 4*d.* each. These are fastened about three inches from one end by

a strong rubber band, and also by a loosely fitting curtain-ring. This makes an excellent tripod, and the projecting three inches of one of the rods acts as a hook. Maps may be pinned on to a piece of cheap joiner's moulding, one inch or so wide, on which string has been fastened.

Specimens of the best mapping work of pupils should be preserved. A collection of pictures should be made, consisting of photographs, engravings, drawings, &c., most of which might be contributed by pupils and their friends. Many picture postcards show geographical facts very well indeed. From a small beginning such a collection grows rapidly, and in ten or a dozen years it might become a very representative and valuable one.

Schemes of Work for Schools of Various Grades.—In the following sections an attempt will be made to show how much geography may be reasonably asked for in elementary, secondary and public schools. At the risk of some apparent repetition it has been thought well to consider in some detail both this and the amount of apparatus required for each class of school.

The Elementary Schools (age ten or eleven to twelve or thirteen).—Let us suppose that during the last two years of elementary school life systematic lessons are given in geography. Two methods of instruction are open. The first is the so-called concentric method. In this the home district is systematically examined from a geographical point of view, utilising the children's own observations where this is possible. In using this method schools in hilly regions have a great advantage over those situated in the plain, and country schools over town schools. The local Ordnance and other maps must be regularly studied. Attention should be paid to the relief of the land and the manner in which it controls the courses of the rivers, roads,

and valleys, and even the sites of villages and towns, as well as irregularities in their growth. The character of the soil and rocks must not be omitted. The water supply is usually local; geographical and geological explanations are often possible. Water supply is very often the determining factor in the location of villages. The distribution of woods and crops, more particularly in hilly districts, can often be explained in terms of soil, exposure, elevation, &c. The positions of the market towns, of the surrounding villages, and of the railway stations and junctions are usually susceptible of explanations which have a geographical element. (See also sections on Home Geography and School Excursions.)

This local geography should be specially emphasised in country districts, and should be co-ordinated with the more advanced Nature Study or Physiography.

If from this local geography it is desired to proceed outwards, it should be borne in mind that the county boundary is probably not a regional division. The whole of the region similar in characteristics to the home district should next be studied. For instance, in a village near the chalk downs or limestone scarps of England, the main features of the whole region of south-east England could profitably be taken after the local geography. The general principle of the distribution can be illustrated by the local conditions. The general grouping of the scarped ridges and clay plains, their varying vegetations, the way in which water supplies, village sites and roads are controlled by them, can all be pointed out. If the school is in the Pennines, the whole of that area might be selected as the second area to study; and so on.

A survey of the British Isles would naturally follow, attention being paid mainly to the outstanding features. The physical and vegetational characteristics of each natural region should be briefly described, and illustrated

by maps and photographs. The position of the chief centres, the roads which cross it, the way these are linked to routes of adjacent regions, or their connections over the sea, should all be pointed out.

Then there should follow a summary of the general characters of the physical features, vegetation, climate, occupations, and density of population, chief towns and routes of the British Isles, with such explanations and correlations with Nature Study (Physiography) work as are possible. All this would occupy one year.

In the second year the larger natural regions of the different continents might be given. The order might be, if it were desired to follow a centrifugal plan: (1) Western and Central Europe, Mediterranean, North America; (2) Eastern Europe and Northern Asia; (3) Australia, Africa, South America. Probably it would be simpler to begin with North America and go on to South America, Australia, Africa, South and East Asia, Russian Empire, the rest of Europe. In the cases of great ports or manufacturing centres it might be profitable to consider first those parts of the world with which they have closest connection.

The second method is to begin with World geography. To provide an introduction to the geography of the World, as the study of the home district provides an introduction to the geography of Britain, an account of a journey round it, with descriptions and occasional explanations, might be used. If continents are taken as units the southern continents are simpler than the northern ones, and of the northern ones North America presents the least complex conditions.

Whatever order is followed, it is important to remember to make constant comparisons between the conditions in natural regions of like type, and to conclude by a general summary of the geography of the World as a whole.

In this two years' course the order might be reversed, beginning with the World and ending with the home district. This could be done by giving the second-year course suggested above during the first year, and the first year's course on the British Isles during the second year. If it was desired to follow the plan of more and more minute analysis from beginning to end, the order on the second year's course could be altered : the British Isles as a whole, their configuration, vegetation, climate, occupations and productions, population, towns, and routes, could be taken first; next, the natural region in which the school lies ; and, finally, the home district.

In country schools it would be well to prolong the period of local geography and to emphasise the geographical conditions of the countries which compete with ours in the production of food and raw material. In town schools the geography of districts and countries supplying raw material and taking manufactured goods should receive special attention.

We may roughly put as *the minimum of geographical knowledge at the age of twelve* : The chief divisions of land and water ; the great areas of mountains, tablelands, highlands, and plains ; half a dozen of the chief river basins in each continent ; the temperature belts—hot, warm, cool, cold ; the wind belts—stormy westerlies, trade, monsoons, calms ; the rainfall regions —rainless, moderate, heavy rains, the regions of marked summer rains and of marked winter rains ; the areas of desert, grassland and forest, and their relation to temperature and rainfall ; general characteristics of human life in deserts, grasslands, forests, in mountain, plain, and coast ; density of population, and a score or so of the chief towns and their position with reference to physical features ; the more important countries in each continent and the capital of each—British lands

being specially examined; the great land and water routes, and how geographical conditions control them; the great ocean routes and ports, and how winds and ocean currents are related, and how they modify the course of sailing-ships.

In such a scheme qualitative rather than quantitative information should be given—*e.g.* the hot belt need not be more precisely defined than that in which it is always hot and never cold; the region of moderate rainfall as that in which there is sufficient rain for ordinary crops, &c.

The maps selected both for wall and atlas should show all these things. World maps might suffice for climate, vegetation, density of population, and political divisions. There should also be plain orographical maps of each continent, without names as well as with names—but if both are not possible then without names—and orographical maps with the chief routes and towns. On these political divisions might or might not be shown, but if shown, they should not be too obtrusive. For home geography the local sheets of the 25-inch, 6-inch, 1-inch, $\frac{1}{2}$-inch (both the Ordnance Survey and Bartholomew's), $\frac{1}{4}$-inch, $\frac{1}{4}$-inch geological, and $\frac{1}{10}$-inch maps should be hanging on the wall, and each pupil should *possess* a copy of either the 6-inch or 1-inch sheet.[1]

Pictures are as essential as maps. Most 'Readers' give pictures, but they are not always well chosen. Each school should have its own picture-books, which should be made of photographs and prints supplied by the teacher and pupils, and taken from illustrated papers, or from any other source.

The blackboard, however, will be the great stand-by of the teacher, who ought to possess considerable skill in drawing on it such simplified maps as will bring out

[1] See pages 215-6.

clearly the precise points he wishes to emphasise in a particular lesson. The art of simplifying maps is one which is only learned by practice, for the power to select from the infinite details of the map those which are geographically important, and the skill to depict them clearly are not to be acquired in a day.

General Remarks.—All through this course the human element should be insisted upon. Occupations and customs should be emphasised as much or more than physical characters, the latter being so treated as to show their part in modifying the human conditions. A broad conception of the lives of other peoples and of the geographical causes to which these are due is not merely a valuable element of culture in the necessarily restricted curriculum of elementary schools, but it is also an essential element in the training of the numerically most important part of the future citizens and voters. A scientific foundation for an *entente cordiale* with other races is thus laid. 'The more we know of the world the more we are filled with respect and admiration for our fellow-men, and the more we desire to be of use to them. We see the Eskimo fashioning the most skilful weapons from the bones of slain animals, building boats of their hides, lighting and warming himself by burning their fat, supporting himself, and bringing up brave and hardy children. The Indian woman in the western desert, where neither wood nor clay is to be had, patiently gathers dry stringy desert plants, plaiting out of them the baskets, water-bottles, and cooking-pots that she needs. The Chinaman works night and day in his flooded rice-fields, knee-deep in water, stabbed with rheumatic pains, bent, weary, glad to creep out of the hot sun under the shady mulberries his thrifty hands have planted along the raised wall of his rice-field. The hill peoples of the Himalayan valleys, terracing their hillsides, ceaselessly carry up soil, basket

by basket, when the foaming river below leaves a little uncovered; they bring water by this laborious method and that, and finally they brighten a tiny patch of the bare hillside with a fruit-tree or two, and a little square of golden barley. Who would not be filled with admiration for a race that shows such noble courage and ingenuity under the hardest conditions of life? We cannot think of men in this way without ourselves becoming kinder and braver, and better fitted for our own battle in life. History and human life take on a new dignity and a new meaning.' [1] Special sympathy will naturally grow up for people who speak the same language or have similar traditions to ourselves, or who are under the same Crown. It is important for the future of the Empire that we should all remember that the majority of British subjects do not speak English, and are not even European in race. This is one reason the more for cultivating the widest possible geographical sympathies.

The Secondary School.—The problem of the school which prepares pupils up to the ages of fifteen or sixteen is a very different one from that of the elementary school. Geography becomes more important for practical reasons, especially in towns. It should also receive fuller recognition because of the discipline it affords. It is the school subject most in touch with modern life, the one which a boy in particular feels to be real, comprehensible, and valuable. If it is made dull it is not the fault of the subject.

No subject lends itself more readily to the invaluable discipline of asking questions and discovering the answers—a practice which can well be followed by boys and girls of this age. From about twelve onwards pupils should learn that text-books are little more than

[1] *Harmsworth Self-educator.* Part I. Article 'Geography.'

convenient summaries, and that they contain by no means everything that a boy or girl of that age wants to know. No school curriculum is complete which omits to allow two or three hours a week at least for such work. Standard encyclopædias and other reference books, atlases, &c., should then be consulted with reference to questions which have cropped up naturally and are not answered in the text-book. The newspaper, the weekly illustrated paper, the local museum, the railway time-table suggest an infinity of geographical questions which the pupil can be set to answer for himself. The answers thus obtained may frequently be used to lead up to some geographical law, thus linking the particular problem to a more general one. But while insisting on the value of geographical questions in this too often neglected part of school work, it is also necessary to insist on a systematic training in the subject itself.

If we consider the five or six years from ten to fifteen or sixteen, the first two may profitably be occupied, by way of preliminary, in a survey of the world somewhat on the lines sketched in the previous section, but rather more spread out. The British Isles might receive a little less full treatment, and the time saved could be given either to the descriptive geography of the World or to the home region, or, better still, to both.

Aims.—Assuming this preliminary course to be completed, we have to plan a three or four years' course which will ensure a new study of the whole of the World. This should be so devised as to give not merely a knowledge of more detail, but also a grip of some leading geographical principles and familiarity with geographical methods. If any sacrifice has to be made, it should be in the details, and not in the exercises for training geographical perception.

The selection of topographical detail is not a particularly difficult matter, though it requires some geographical training on the part of the teacher. The hard task is to decide just what geographical problems boys and girls of this age should tackle. They are now old enough to understand more about climate and more about plant physiology, and consequently a correlation of the geography of climates and vegetations may be attempted in a more thorough manner than in the preliminary course. Quantity as well as quality can now be considered.

It is also necessary to consider the future of the pupils of these schools. The boys will probably go into business of various kinds or become farmers. For most of them it is likely that a knowledge of the economic conditions of the World will be of great value. While it is exceedingly undesirable that so-called commercial geography should be taught as a special subject in our schools, it is most desirable that economic conditions should be emphasised in the relevant lessons. If the more dramatic and domestic side of human geography should be taught in the preliminary course, the economic aspect should be emphasised in the course which follows. Scientific geography should gradually supplement the descriptive geography of the earlier stage. In this survey of the World, in addition to a closer examination of topography, there should be a more systematic examination of the relations between the outstanding topographical, climatic, and vegetation features, and the effect of all of them on the main occupations of different peoples, on the distribution of economic products, on the courses of the great trade routes, and on the positions of the greater commercial centres.

The Course Proper.—Here, as in the preliminary course, local exigencies and individual idiosyncrasies should be duly recognised so long as a general study

of the World as a whole and a more detailed study of at least the British Isles are not neglected. There is no lack of centripetal, or centrifugal, or mixed schemes of work which may be adopted. The one point which must never be forgotten is that, in addition to going over the whole of the World's surface, it is necessary to ensure an increase of geographical skill. A judicious selection of the order in which the parts of the World are studied is of great help in securing this.

Order of Continents.—In this scientific rather than purely descriptive study of the World it is probably best to take the continents as units. The southern continents are more compact, simpler in configuration, in climatic and vegetation divisions than the northern ones. Human conditions are also less complex and on the whole more directly controlled by geographical conditions. Hence, as a rule, it is well to take the southern continents before northern ones. A year might quite well be given to them and to the physiographic explanations of their configuration, climates, and vegetations. Comparisons between regions which are similarly situated geographically can be made by the pupils themselves. These add zest to the study and are of great practical value.

This year of thorough work will establish many principles which can be applied at once in the following year, when the northern continents are taken, so that much time will be saved in dealing with their more complex conditions. North America is the simplest of the northern continents, and can be most easily compared with the southern continents, especially with South America. On this ground there is much to be said for taking it before Eurasia. There are many arguments for and against taking Asia before Europe. Perhaps the chief one in favour of it is that it draws the course to a close by bringing the pupil back to Britain.

The habit of comparing homologous regions should everywhere be encouraged. A teacher requires a geographical training to do this with certainty. The lack of such training is responsible for the ingenious but often false analogies which are found in some text-books and are common in examination answers. A sceptical friend of the writer declares that on asking a teacher of geography why the people of Liechtenstein were accomplished whale-fishers, he at once received the answer that it was because the Rhine is an excellent 'natural' route to the North Sea, which again is the 'natural' highway to the whale-fisheries of the Arctic Ocean, and that the inhabitants of the upper Rhine Valley would thus 'naturally' be drawn to the whaling industry.

One year should be given to the British Isles, about which more will be said in a future paragraph.

The Three Years' Course.—The writer ventures to suggest to those who have no special reasons for adopting one plan more than another that the three years' course should consist of: (1) the British Isles; (2) the Southern Continents; (3) the Northern Continents; ending with a short revision of World geography in the light of fuller knowledge.

The Four Years' Course.—Where there is a four years' course the revision of the World geography would be postponed to the fourth year, and special attention could be paid to (*a*) British Possessions; (*b*) Great Trade Routes by land and water. In addition, the natural region of Britain in which the school is situated could be the subject of a term's work, during which the geologic conditions, the topography, water supply, vegetation, population, routes and towns, administrative divisions and place-names could be examined more systematically and in greater detail.

General Method of Treatment.—The best school

is not that which imparts most information which its pupils can pour out in examination, but that which teaches its pupils how to get information *and how to use it.* For this purpose geography is an excellent subject. All that is required is (1) a really good atlas and collection of wall-maps showing orographical, climatic, and vegetation features, and illustrating human conditions, such as density of population, dominant occupations, &c.; (2) outline maps; (3) a good collection of photographs; (4) some descriptive works; (5) statistical works, such as the 'Statesman's Year Book'; (6) a good encyclopædia or sets of standard reference books. The pupils should all possess—what is not readily come by—a good atlas; a text-book is a secondary matter.

The pupil's attention is first directed to the orographical map. He is asked to make a freehand general sketch of the outline, to shade the mountainous areas, to draw the main streams of five or six of the chief rivers. Next, the course of two or three contour lines should be traced—say, 600, 1000, 3000, 6000 feet. The area and the proportion of the land between them and the areas of the larger river basins should be roughly estimated. The long and short slopes of the land, the lowest parts of the mountains, the way the rivers run, and the character of the coast are next to be considered. Sections should be made across the continent on squared paper. Different vertical scales should be used in order to accustom pupils to the idea that when the vertical scale differs from the horizontal one, allowance must be made in interpreting the slopes. All this work should be illustrated by photographs of different parts of the continent.

In these photographs much attention should be paid to the surface covering, and then the vegetation map should be studied and compared with the orographical

one, and with the latitudes shown at the side of the map.

From this the pupil should turn to the climatic maps, rainfall maps being compared with orographical and vegetation maps, and then with the wind map. A temperature map—not reduced to sea-level as regards its main colouring, but with one or two reduced isotherms drawn across it—should be compared with latitude and with the orographical and wind maps. An attempt might now be made to explain the vegetation map more fully.

The next group of geographical facts is the human one—density of population and occupations being the most important. These have to be compared more particularly with vegetation maps. The maps of mineral resources may be compared with the orographical maps, but the two are not always closely correlated. The mineral map serves, however, as one of the keys to the map of industries and density of population. The minerals to which attention should be specially directed are coal, iron, copper, gold, silver, and salt in the first place. In certain parts of the world other minerals are of very great importance—*e.g.* tin in the Malay Peninsula, diamonds in South Africa.

All this study has to be made more real and vivid by means of photographs and descriptions. It has to be made more precise by measurement of the approximate areas of different orographical, rainfall, vegetation, &c. regions; and by the pupils making diagrammatic maps simplified from those in the atlas. For instance, most rainfall and temperature maps show many isometric lines for different months. Special attention should be paid only to a few of these. The rainfall lines of 10, 20, and 40 inches for the year; 1, 2, and 4 inches for the months; and three times that for the seasons may be selected, or the isotherms of 30°, 50°, and

70° F. (or 0°, 10°, and 20° C.). The pupils should be taught to make synthetic maps (see p. 211)—*e.g.* they might upon an outline map (showing the rivers) mark the isotherms of 30°, 50°, and 70° for the coldest month with a solid line, and those for the warmest month with a dotted line. By inspection it is now easy to see which parts of the continent have the greatest range of temperature, and which the least. These might be indicated by different kinds of shading. Another set of exercises of great value at this stage is the making of seasonal diagrams of possible sunshine, temperature and rainfall on squared paper. In the case of rainfall diagrams, if time permits, the percentage of the total annual rainfall should also be calculated for each month, and used to construct diagrams which permit a more ready comparison of the relative importance of the seasonal rainfall at different stations. Maps of density of population, diagrams of trade, and many others too numerous to mention can be devised, and are found useful in stirring up interest and leading to precise knowledge.

When this general study of the conditions of each continent is finished a brief review of its natural and political divisions may be made, and of the chief trade routes across their frontiers.

Special Course on the British Isles.—The method followed in studying the continents can be applied to the British Isles with a few modifications. The most important of these are due to the comparative uniformity of climate and products, and to the knowledge which the pupils already possess of a limited part of the country.

One term can profitably be spent in studying local conditions and the geography of the natural region of Britain in which the school lies. For this study the school should possess wall-maps on at least ½-inch-to-the-mile scale. Those made of Bartholomew's or

Philips' contoured maps, or of the Ordnance Survey new edition of the ½-inch map, are to be recommended, especially editions showing nothing but contours, rivers, and hill shading. The ideal would be to have hanging alongside of each other (*a*) the Ordnance Survey sheets; (*b*) Bartholomew's or Philips', both without names; and (*c*) either (*a*) or (*b*) with a few of the more important names printed in bold characters, the chief railways and canals, and a selection of the main roads. The sheets for each of these maps will cost from 5*s*. to 15*s*. or £1 each, depending on the area. If the teacher cannot mount the sheets himself, the local bookbinder, if properly supervised, should do so at a small cost. It is well, however, for the teacher to cut the sheets so that they fit, and to supervise the mounting personally. The Devon County Council and the Staffordshire County Council have issued good orographical maps, and two Lancashire teachers have prepared an excellent one of Lancashire, which is published by Edward Stanford. All of these, however, show too limited an area. A wall-map should be made of the same area to show the geological features, using the ¼-inch-to-the-mile map, which costs 2*s*. 6*d*. per sheet.

The teacher will find it profitable to make on tracing-paper a number of special maps—*e.g.* one showing *every* river, but nothing except the rivers as far as drawn on the ½-inch map; another showing every town and building and nothing but these. Both of these may be compared with the orographical and geological maps.

For the more immediate neighbourhood the same should be attempted with the surrounding four or six sheets of the 1-inch Ordnance map, from which tracings can be made of (*a*) contours alone; (*b*) rivers alone; (*c*) contours and rivers; (*d*) woods, parks, and orchards; (*e*) houses. The sheets with the parishes should be mounted together, and a tracing made which could be

used for showing density of population, which can be calculated from the figures given in the volumes of the Census Reports dealing with the relevant counties.

In country schools some of the sheets of the 6-inch-to-the-mile map should be procured and coloured by the pupils to show what is grown in the fields. When this is done year after year a most instructive series of maps showing the local rotation of crops can be obtained.

In towns the 6-inch sheets are also useful for out-of-door work.

Each pupil should possess the $\frac{1}{4}$-, 1-, and 6-inch Ordnance Survey sheets with the school in its centre. Special editions can be obtained at the prices indicated on p. 215.

For the British Isles as a whole good orographical wall-maps are essential. There are now a large number on the market. Hanging alongside should be a geological map, a rainfall map, a vegetation map, a density of population map, and a route map. Unfortunately, all these cannot be obtained as wall-maps, but they can be found in the Diagram Company's collection of lantern-slide maps. There is no reason why a teacher should not make many of his own wall-maps (see p. 220).

The pupils themselves should possess a good orographical map, such as is common now in most atlases. They should also be supplied with outline maps (*a*) of the British Isles, showing the rivers; (*b*) of the British Isles, showing county boundaries; and (*c*) of North-West Europe, the same size as the weather report map and showing the weather report stations.

It is, of course, quite impossible in this article to give an account of all the exercises that may be attempted on such maps. The writer has tried to show how these may be used in the case of the British Isles in the 'Oxford Junior Geography,' published by the

Clarendon Press. Among the exercises there recommended are measurements of lengths and areas, and the making of rainfall and other climatic maps, economic maps, density of population maps, and so on. There are also a large number of excellent map exercises in Mr. L'Estrange's 'Progressive Geography,' published by Philip.

Special mention, however, must be made of the importance and value of utilising the official weather reports, both for the light they throw on the general weather phenomena which are characteristic of vast areas of the earth's surface, and for their significance in the study of the climate of the British Isles. Every school should for one year at least have subscribed to the daily weather reports.[1] The figures given in that report can be put on the outline map, isotherms and isobars and wind-arrows drawn, and then the pupils' work compared with the official map. Along with the weather report the record of the school barograph or barometer, the variations of wind, cloud, and temperature should be examined. This gives the pupils a real grasp of the weather conditions of our island, which is not merely of practical account, but is invaluable for understanding the geographical conditions of other countries in the same climatic belt. Then, perhaps, the belief that the Labrador current affects the climate of the interior of Canada, and the other myths which flourish owing to the lack of even the most rudimentary ideas of the geography of the atmosphere will finally be discredited.

The use of such Blue-books as the Agricultural Returns and Census Reports should be encouraged even at this stage. It is a good thing to give as home exer-

[1] Some day it may happen here, as in the United States, that every school which agrees to display the weather maps in a prominent position will receive a free copy.

cise the plotting, on an outline map showing counties, the density of sheep per 1000 acres by help of a table calculated from the first-named Blue-book in a way explained to the class.[1] The pupils could be asked to compare the results with orographical, rainfall, and geological maps, and draw conclusions. They would learn far more by doing this, and would remember better what they learned than by spending the same time reading a text-book. The teacher would, of course, enforce the lesson by showing views of different sheep-fields—*e.g.* on Romney Marsh, on the Downs or Limestone Heights, on the Southern Uplands. The more real the geography of Britain can be made to pupils the more real will they find that of other lands.

The Public Schools.—In the upper classes of our public schools, and other secondary schools in which boys remain till they go to the university, geography is very commonly omitted altogether. It is hardly necessary to point out how absurd this is. The boy of fifteen or sixteen is ready, if he has passed through such a course as is outlined in the preceding pages, to consider some of the most important practical problems of geography. That these should be studied in the great commercial centres where the young men are preparing for business life will readily be conceded. It is equally urgent in our great public schools, where youths naturally look to the public services as a career. On the classical side of such schools the training is highly specialised, and deals for the most part with the languages, literature, history, political problems, and political ideals of the Mediterranean peoples in ancient times.

Admitting for the moment that the evolution of human thought and endeavour in the Mediterranean

[1] The calculations themselves might be made in the arithmetic hour.

basin in Greek and Roman times is, from an educational point of view, the most valuable subject in the upper classes of public schools, and assuming that this conviction inspires the work of our public schools, geography is, perhaps, nowhere more indispensable. It is needed both to correlate and to correct. It correlates by concentrating attention on the stable elements which have permanently influenced the successive phases of Mediterranean history, and set the limits to as well as presented the opportunities for human endeavour within the Mediterranean area. It corrects by calling attention to the existence of other civilisations under other conditions, thus preventing the popular delusion that there has been only one area with a highly developed civilisation. Further it calls attention to the complexity of modern conditions outside the Mediterranean basin, a complexity which renders it exceedingly dangerous to attempt any direct application of conclusions justified for the Mediterranean area in ancient times, without some attempt to estimate the disturbing effect of differing geographical and historical conditions. To accomplish all this, however, the geography taught must be something very different from much that is commonly called by that name. In classical schools the human aspect would be emphasised, and the subject would not be so precisely limited as in a purely geographical treatise. The knowledge of history and of natural science which such older pupils possess will permit of a profitable revision of the progress of the World from a new point of view.

In the course pursued by boys leaving school at sixteen or seventeen, the attachment of man to the soil in the present, the ways in which the different geographical conditions affect the occupations and the settlements of man, should be especially studied. The continents may be taken as units. In the more ex-

tended course now being considered the influence of the geographical conditions at different periods can be studied and more salient and obvious phases of the evolution of other geographical conditions—physical and human—can be examined. The unit for this purpose should be a natural geographical one smaller than the continent. The various major natural regions, each with its characteristic physiognomy, might profitably be selected, and not the varying political divisions. These divisions, as they exist at present, were rightly examined in the elementary and the briefer secondary school courses, both because of the practical importance of a knowledge of such divisions, and because they are, for the time being, well-recognised divisions with political, social, and economic, if not well-marked physical boundaries. But when the past is to be taken into account as well as the present, the unchanging, or relatively unchanging, geographical conditions—*i.e.*, the natural regional divisions of the surface of the globe—must be primarily considered, for these it is which have controlled the varying phases of political and economic and social geography.

The political or the economic aspect would be emphasised according to the character of the school. The natural regions in which the higher civilisations have developed and those which are under British control would be selected for more careful study. In schools where natural science is taken up in some detail it would be desirable to make a more systematic study of land forms, with some explanation of the origins of the more important. A brief outline of the gradual evolution of the present continents and their major features, their flora, fauna, and inhabitants should be given. In such schools or in 'science sides' this should not lead to the exclusion of the human geography noted above, for human geography will

supply useful correlations and correctives to the bias given by a too exclusive study of physical science.

The order in which the natural regions are taken is less important than in less advanced classes. Suppose a three years' course has to be planned. For classical schools probably the Mediterranean basin should come first, and be studied most thoroughly. The regions to the north and the British Isles could be distributed over four terms. The geography of North America and of Asia would be enough for the next two terms. One term, or even two, could be given to the southern continents, and the concluding term or terms to a special study of the geography of the home district and to a general survey of the place of Britain and the various parts of the British Empire in the World, and the links of communication by land and sea.

This study will be made more useful, and many of the most valuable elements of the geographical discipline will be ensured, if the pupils are constantly led to distinguish between geographical conditions which have and geographical conditions which have not been utilised by man. From this arises the further question as to which geographical factors must, so far as our existing experience goes, be considered as final and inevitable, setting limits which human action cannot overpass. Such a problem, for instance, is that of the limitation imposed on settlement in desert regions, except in the areas to which man can bring water. In recent years in Western Australia water is carried to the goldfields through hundreds of miles of pipes, but at last a limit is reached, either from the cost of maintaining settlement or the precariousness of life. Again, the smallness of the existing oases relatively to the whole desert, and the comparatively small area which can ever be made to 'blossom as the rose,' may be demonstrated by actual calculations; for measurement

and calculation must not be omitted wherever they can be properly introduced. Other obvious problems are such as are presented on the richer grasslands of the World, where one type of culture pushes out another —*e.g.*, in the prairies of North America, the steppes of Southern Russia and Siberia, or the veld of South Africa.

Boys educated in the type of school with which we are now dealing will supply a large proportion of those who are destined to control the world in their day and generation. Their thoughts should from time to time be turned to consider the kind of world in which they may have to live and work nearly a generation hence. Geography supplies a steadying element in such speculations, and gives a firmer basis on which to build. The seasons will remain similar within very narrow limits; the main features of climate and soil and the great natural regions will still exist, though man may have destroyed the original vegetation and introduced a new one. If the imagination of pupils of tender years should be stirred by tales of strange peoples in distant lands, that of pupils on the threshold of manhood should equally be fired with interest in the past and the future, so that the present comes to be viewed as only an intermediate stage, intensely interesting but not necessarily permanent, the child of the past, the parent of the future. Towards the shaping of that future, or towards the thwarting of it, the pupils of such a school will be called to play their part. Nothing is of such ill omen, nothing certainly is more disheartening for those who have to deal with them in their early years at the university, than the too common assumption of many public school boys that the serious problems of life are 'all rot.' We shall not, perhaps, go too far if we say that where this is the opinion, geography has either not been taught at all, or that it has been very imperfectly and inadequately taught.

The methods employed in a three years' course should involve an increasing amount of independent work on the part of the pupils. The facts systematised in a good general atlas will be the basis, but the reading of good books of travel, of histories dealing with social movements rather than with individual action, and of selected chapters of advanced books dealing with geographical aspects of other divisions of science, should be fostered. Among such books Schimper's 'Plant Geography,' Wallace's 'Island Life,' Ripley's 'Races of Europe,' may be named.

Much use may be made of local conditions. Those interested in natural history or botany may be encouraged to find out and map on a 1-inch or a 6-inch sheet the distribution of plants or insects. Those preparing for the army can attempt field-sketching and study the local land-forms. Others will try to explain the geographical position of any antiquities in the home region, or will study the origin and distribution of the place names. Any geographical hobby appropriate to the home region is an invaluable supplement to the systematic school work.

Equipment.—The equipment for the senior course should comprise, in addition to what has been already noted, more atlases, maps, and books. These should include a standard reference atlas of first-class excellence, such as Stieler's, the physical atlas of Berghaus, with Bartholomew's Atlas of Meteorology, the atlases of the Atlantic, Indian, and Pacific Ocean published by the German National Observatory, in addition to at least one complete year's series of the Monthly Pilot Chart of the Atlantic and Indian Ocean issued by the British Meteorological Office, and those of the Pacific Ocean published by the United States Coast Survey, such special atlases as Bartholomew's Atlases of Scotland and of England and Wales, Vogel's Karte

des Deutschen Reiches, Constable's Atlas of India, the Climatological Atlas of India issued by the Government of India, and the large atlas of Canada published by the Dominion Government.

There should be a small collection of maps illustrating different types of topography—volcanic, tabular, highland, mountain ridges, valleys, dunes, varieties of plains and coasts, and of others showing sites of the great cities or of important battlefields.

The Training of the Teacher.—The most important part of the school equipment for teaching geography is a thoroughly well-trained and enthusiastic teacher. While the man who is a day ahead of his class may manufacture interesting enough geography lessons, they are not likely to be systematic or of great educational value, at any rate in the upper classes. The writer has listened to many such lessons and seen the outline of others, and has usually found that all the salient geographical points were missed. The man with a purely literary and historical training is apt to make bad 'howlers' in morphology or climatology, while the man trained exclusively in natural science or mathematics is apt to deal with isolated phenomena and to pay little attention to the human element.

Geography, it has often been pointed out, is a link between the literary-historical and the mathematical-natural science 'sides' in schools. The teacher of geography must know something of both classes of discipline. In the universities of some States of the German Empire geography is a subject which may be taken for a teacher's diploma either by a philosophical student or by a natural science student. In some of our own universities, as, for example, at Oxford, it is very properly included in the faculty of Arts as well as in the faculty of Science. One of the great difficulties in the way of a proper training in geography is the very

considerable preliminary requirements of the student. For the study of land-forms a knowledge of elementary structural geology is necessary, as well as a course of such elementary physiography as includes the data common to both geology and geography. For a proper understanding of climate some acquaintance, experimental if possible, with the theory of heat, with elementary meteorology, and with the common meteorological instruments is required. Before beginning the study of vegetation and its distribution in relation to climate, some knowledge of elementary plant physiology is highly desirable. The study of human geography, the branch of geography which deals with the varied activities of man, their distribution, and the causes on which this distribution depends, ought to presuppose at least an elementary knowledge of ethnology and sociology. This would prevent many of the plausible but false conclusions which are only too common in a subject which tempts the ignorant to premature generalisations. If this were supplemented by a knowledge of the outlines of economic history, at least of that of Europe, it would be all to the advantage of the student. Owing to the one-sided education given in the majority of our schools, where a knowledge of words is still regarded as more useful than a knowledge of things, a student possessed of anything like this outfit is a *rara avis* indeed. At the present time it is necessary to let a student of geography specialise either on the side of natural science or of the human sciences. To a student who wishes to prepare himself privately for a course of geographical study at the university we should recommend a short course on the theory of heat, paying special attention to the problems of latent and specific heat and to conductivity and convection, a study of the physical and structural sections of some standard work on geology, and of a good introductory physiography,

supplemented by selected chapters from such books as Darwin's 'Voyage of the Beagle,' Brehm's 'From North Pole to Equator,' and Wallace's 'Island Life.'

In our training colleges, courses in geography vary greatly in quality owing to the fact that the subject does not yet receive proper official recognition as an examination subject. This extraordinary state of affairs will, we hope and believe, soon be remedied. In recent years the leading universities in this country have organized geographical departments, and in most it is now possible to take geography either as an optional subject for the ordinary pass degree, or to obtain a special university diploma after a year's study. Particulars as to university courses in Great Britain were given in the 'Geographical Teacher,' June 1906.

Conclusion.—From the tenor of this article it should have been gathered that geography is one of the essential subjects in modern education, one of the most difficult, most vital, and most practical. The conception of its scope has rapidly widened, and with each widening its value as an instrument of educational discipline and at the same time of practical importance has increased. A quarter of a century ago it was commonly taken to be the subject which answered the question 'Where?' Mr. H. J. Mackinder, the first Reader in Geography at Oxford, who has done more than perhaps anyone else in this country to secure a general recognition of the importance of geography, showed by his brilliant teaching in the early 'eighties' that this conception was far too narrow, and insisted that besides the question 'Where?' geography must answer the further question 'Why there?' Even this is not enough. The geographer has to concern himself not merely with the cause of any given distribution, but also with its far-reaching and closely interwoven consequences. The question 'Why there?' must be

supplemented by the question 'What results follow from its being there?'

In a subject which deals with so vast a mass of material from so many points of view, it is obvious that the amateur can hope for but little success. The teacher must have a well-planned and comprehensive training if he is to distinguish true geographical facts and principles from the pseudo-geography which is all too common. This distinction is all-important, not merely to the business man who wants to acquire knowledge without which he cannot succeed in business, but also to every citizen, whose vote will help to decide questions which as a rule involve some geographical factor. Geography is essential for the proper understanding of the problems of the different parts of the Empire, and for the promotion of a sympathetic attitude towards the other nations, great and small, with whom our contact becomes closer every year. Its study should thus be utilised to give a true appreciation of the conditions and needs of the home region, and of its relation to the great world outside, and thus to develop first a local patriotism, then the larger patriotism of country and Empire, and, finally, as knowledge widens, and imagination and sympathy become more acute, the largest patriotism of all—that of the citizen of the world.

FOR FURTHER READING.

Geikie, Sir Archibald, *The Teaching of Geography*. London: Macmillan & Co., Ltd.

Parker, Francis W., *How to Study Geography*. New York and London: Appleton.

Lehmann, R., *Beitraegen zur Methodik der Erdkunde als Wissenschaft wie als Unterrichtsgegenstand*. Halle a. S.

Kirchoff, A., and Guenther, S., *Geographie Unterricht* (*Erdkunde und mathematische Geographie*), 2te Auflage, pp. 68 and 47.

Muenchen : Beck, 1906. [Republished from Dr. A. Baumeister's *Handbuch der Erziehungs- und Unterrichtslehre für hohere Schulen.*]

Fischer, H., *Methodik des Unterrichts in der Erdkunde.* Breslau : Hirt. 1905.

Keltie, J. S., *Geographical Education.* Report to the Council of the Royal Geographical Society. R.G.S. Supplementary Papers, vol. i., 1886.

Herbertson, A. J., *The Position of Geography in the Educational System of the Country.* Report of a Committee of the British Association, Toronto, 1897.

Mill, H. R., *Hints to Teachers and Students on the Choice of Geographical Books.* (A second edition, prepared by the Geographical Association, will appear early in 1908.)

Report of the Committee of Ten on Secondary School Studies. New York : American Book Co. 1894.

See also articles too numerous to mention in :

Journal of School Geography, and its successor,

Journal of Geography (Teachers' College, New York).

Geographical Teacher (Philip & Son, London).

Zeitschrift für Schul-Geographie (Vienna).

Geographischer Anzeiger. (Gotha.)

Geographisches Jahrbuch (Gotha), bibliography.

Bibliotheca Geographica (Berlin).

Annales de Géographie (Paris). (The September number is devoted to bibliography.)

Geographical Journal (London). (Monthly bibliography.)

Reports of the International Geographical Congress.

And other geographical periodicals, and such educational reports as are issued by the Board of Education in this country and by the United States Commissioner on Education.

SECTION IV

HISTORY

Aims.

The schoolmaster who teaches history is confronted with three fundamental questions—why, what, and how ? Why, in these days of crowded curricula, should we teach children history at all, seeing that the study is one which is more especially suitable to the adult mind ? What part of the vast field of history should be chosen for the subject-matter of school work ? How can the material chosen be used to carry out to the fullest extent the aims which we set before us in introducing the subject into the curriculum ?

Of these three questions the first is the most important, for on it depend the answers to the other two. Moreover there is a great danger that much of the value of history lessons may be lost through want of clearness on the part of the teacher as to the exact value of history as a school subject, and as to the aims to be kept in mind in teaching history. It is true that there are differences of opinion here. Some who demand for history adequate recognition in the curriculum would lay greater stress on its value as an 'information subject,' some on the opportunity it gives for mental training not supplied by any other school study. But however much we may differ in expanding them we should all agree with the words of Bishop Stubbs : 'I desire to use my office as a teacher of facts, and of the right habit of using them.' We feel that a knowledge of history,

even such a knowledge of history as can be obtained at school, is, to quote Bishop Stubbs again, part of 'the apparatus of a cultivated life.' It explains present-day institutions and politics, throws light on literature and art, invests with interest places and buildings of historic associations, gives knowledge of human character and of the progress of civilisation.

But this is only true if the knowledge of history is real knowledge, if the facts have been turned into faculty. We can only teach facts in any true sense of the word if we teach the right habit of using them—if we train the power of 'historical thinking, which is better than historical learning.' It is important, then, to consider what the training of the power of historical thinking involves, and what is meant by the development of the historic sense in our pupils.

The 'Historic Sense.'

In the first place it is a training in imagination and sympathy, in the power of picturing conditions and circumstances widely differing from their own, in the power of seeing things as they appeared to people of other times, in the power, in fact, of putting themselves in the place of the men and women of bygone days.

'The great object of teaching history is to enable people to realise that men were very different formerly from what they are now; that this world in which we are now is not a normal world; that there is not such a thing as a normal world; that the world is constantly changing and developing' (*Bryce*).

In the second place it is a training in reasoning and judgment applied to human affairs and human action. The 'Report of the Committee of Seven' says: 'History has to do with the becoming of past events—not simply with what was, but with what came to be—and in studying the simplest form of historical narrative even the average pupil comes to see that one thing

leads to another ; he begins quite unconsciously to see that events do not simply succeed each other in time, but that one grows out of another, or rather out of a combination of many others.' Even schoolboys can be trained to look for cause and effect, and their sense of proportion can be developed in learning to distinguish between the important and the unimportant. They can be encouraged to trace motives and to estimate the wisdom of actions, and in this way their power of practical judgment is exercised. Also they can be made to realise the impossibility of always reaching satisfactory conclusions, and thus they may 'learn the great lesson of suspense of judgment.'

In such ways as these the school can lay the foundation of the habit of historical thinking, and give the children training which should be useful to them in realising the situations and in attacking the problems of life.

Further, no teaching of history can be satisfactory which does not aim at implanting a love of reading, and teaching to a certain extent at any rate the use of books. Lastly, while the educational function of history is primarily intellectual, the history lessons may and should play some part in the moral education of the child. They should result in increased veneration for truth, in the acquisition of noble ideals of conduct, in the development of an intelligent patriotism.

We cannot teach much history in schools, but we can and should teach enough to create an interest in the subject, and set the children in the right way of continuing their historical work after school days are over ; we can teach enough to make their after lives fuller in interest and to make them better fitted for the problems of citizenship and life.

It is generally acknowledged that in a school where the pupils enter at seven or eight years of age and

remain till they are eighteen the work in history passes through three stages. In the earliest stage the history is presented as a series of isolated stories; in the next stage it is a continuous narrative, with attention to causal as well as to chronological sequence; in the third stage the teaching is more abstract than in the other two, the order is often topical rather than chronological, and attention is largely concentrated on the significance of facts. In these stages there are differences of aim.

Three Stages of Instruction.

In the first stage the great object is to stimulate, guide and control imagination, to arouse interest in the past, and if possible to introduce the children to some of the most important 'friends of the olden time' whom they will meet again in the next stage. But even here we have not only to tell and to interest, but to teach. The children must remember the essential points and the sequence of the story, and even at this early stage they can begin to reason and ask Why?

In the second stage we begin the teaching of connected history and lay a solid foundation of historical knowledge. Here as the child grows into the boy or girl the power of imagination must not be suffered to die away, but must be strengthened and disciplined. Interest in the past must be deepened, the sense of time, of continuity and perspective gradually developed, and the connection between past and present made more patent. The habit of pondering should be encouraged, and the sense of proportion with its consequent power of selection fostered. A notion of the nature of evidence should be introduced, we should begin to teach the use of books and to train pupils to write clearly and with relevance upon historical topics.

In the third stage the student is trained to read and think for himself and to systematise his knowledge; he learns to take notes, to 'get up' books and topics

for himself, to write more independently than was possible in the preceding stage, and in all these exercises to weigh and compare evidence. Here the lessons will consist partly of lectures and partly of the discussion and criticism of papers written by the students. It is a good thing to let the class have at the beginning of the term a syllabus of the lectures which will be given and the topics for private reading. Very valuable hints on the teaching at this stage can be obtained from Mr. C. H. K. Marten's 'Syllabus of British History' (Spottiswoode), and from the description of a discussion class in Mr. W. M. Child's lecture mentioned below.

The classification into three stages should not, however, be pressed too far. It is convenient to recognise the threefold division of the course in the same way that it is convenient to make the broad distinction between ancient, mediæval and modern history. But the essential unity of the school course should be as great a reality as the unity of history itself. In the course, as in history, there are transition periods, and it is not easy to say where one division ends and the other exactly begins.

The general opinion seems to be that the story stage should end when a child is ten or eleven; some would even prolong it to the age of thirteen or fourteen, while others again would end it at eight or nine. I think myself that with intelligent children the transition from the isolated story stage to that of continuous narrative should be made as soon as possible, as the sense of continuity is one of the most important things to be developed. In that case the second stage would cover the greater part of an ordinary elementary or secondary school course, for the third stage would not be reached by the average pupil before the age of sixteen. The bulk of the work done at school in history is therefore of a preparatory or introductory character, to be

completed by the studies of the university or the self-chosen reading of later life.

Having settled clearly for himself what are the aims and objects of history teaching in schools, the teacher is next confronted with the problem of subject-matter. The question of the curriculum bristles with difficulties and has to be solved independently for each school, with reference to the length of the school course, the time devoted to history, the ability of the scholars, and the knowledge of the teachers. It is of the utmost importance that there should be a carefully thought-out scheme, which regards the work of the school as a whole, the studies of one class leading up to those of the next above, and taking account of those which have gone before.

Subject-matter.

The main points for consideration are two, viz., the subjects to be included and their place in the course, involving the question of 'outlines *v.* periods,' and the possibility of correlation with other subjects in the curriculum.

In the first or 'story' stage the subjects should be chosen from legend as well as from history proper, and from ancient as well as from modern history. They should certainly not be chosen exclusively from English history, for many of the Old World stories appeal particularly to young children. It seems well that the stories should be given in chronological order and that they should be selected partly for their value as stories and partly for their value in preparing the way for the subject-matter of the next stage, that of continuous narrative.

In respect of this second stage there is very general agreement that, whatever the scheme does or does not include, there should be adequate provision for the teaching of 'the salient points' in the history of our

country and Empire. But exactly what is covered by this elastic phrase is a problem in itself. It is all to the good when the chief landmarks in the history of Scotland and of Ireland are not ignored and when the history can be carried in outline up to the present time in order to show the connexion between the present and the past.

British History.

There is a growing feeling that we should follow the example of other nations, and not confine ourselves either in elementary or in secondary schools to the history of our own country. In spite of some prejudice against 'universal history' there seems to be an increasing demand in secondary schools for a course of general history which shall begin with a short introductory survey of the early Oriental civilisations, pass to the history of Greece and of Rome in broad outline and thence to the main landmarks of European history. In the words of Mrs. J. R. Green 'the girl should have had the great panorama of history unrolled before her, and without being confused by too much detail, should have seen the continuous story of man in due succession of time and in just proportions of great and small, and gained some idea of the continuity, the relations, and the contrasts of that strange record.' The 'Committee of Seven' reported much in the same sense: 'We ask then for a course in history of such length that the pupil may get a broad and somewhat comprehensive view of the general field, without having, on the one hand, to cram his memory with unrelated, meaningless facts, or, on the other hand, to struggle with generalisations and philosophical ideas beyond his ken. We think that a course covering the whole field of history is desirable, because it gives something like a proper perspective and proportion; because the history

Universal History.

of man's activities is one subject, and the present is the product of all the past; because such a study broadens the mental horizon and gives breadth and culture; because it is desirable that pupils should come to as full a realisation as possible of their present surroundings, by seeing the long course of the race behind them; because they ought to have a general conspectus of history in order that more particular studies of nations or of periods may be seen in something like actual relations with others.' A general course of this kind occupies at least two years and therefore can only be taken by giving up a fairly large proportion of the time which might otherwise be spent on English history. But the sacrifice seems worth making even in the interests of English history itself. 'What should they know of England who only England know?'

Among the schools which attempt such a course there is much diversity of practice with regard to its place. A good deal may be said in favour of taking it as early as possible, so that pupils who leave without reaching the higher classes shall have been through this course and shall have benefited by the added interest which it should give to other subjects—Scripture history, literature, geography, and languages. Moreover children of eleven to twelve find much that appeals to them in a simple presentation of ancient and mediæval history.

The danger that the work done at such an early stage will be forgotten must be faced and obviated, both by formal recapitulation and by the recalling wherever possible of the knowledge of general history in connexion with English history and with other subjects.

There is great diversity of opinion respecting the value of 'local history' as a school study. Of the importance of utilising the historical associations of the

locality there can be no doubt, but whether this can be done best by working in the local history with the general history of the country, or by taking a separate course for it, is a debatable point. If the course is taken, some would give it the first place in the second stage as an interesting and natural introduction to English history; others would take it as a revision course after the English history has been gone through once or twice.

Local History.

With regard to the teaching of civics, there is again a growing tendency to follow the example of France and America, and give to the pupil before he leaves school a course of lessons on the rights and duties of a citizen. This can also be used as a means of revising some of the more outstanding events of constitutional history. Its proper place seems to be near the end of the second stage.

'Civics.'

The question of outlines *v.* periods involved in the idea of a course of general history is even more prominent with regard to the teaching of British history. Those who prefer to go slowly through the history, taking a different period each year, urge that by this means alone can sufficient time be obtained to make the past real and to get the full educational discipline out of the history lesson; they also point out that history has often to be taught by those who are not specialists, and that it is easier for such teachers to take a short period than broad outlines.

'Outlines' or 'Periods'?

The advocates of the opposite procedure reply that where teaching by periods is carried to excess it is possible for a pupil to leave school without having any knowledge at all of some periods, while perhaps through the exigencies of examinations or transference from one school to another he may have gone through other periods several times. They also point out that any period needs

to be considered in the light of the whole, and that if certain periods are taken once only, and that in the early stages of the course, some very important aspects, too difficult for young children, cannot be considered at all. Moreover this system tends to weaken the sense of continuity which is of such great importance. With regard to the necessity for detail, the opponents of the system maintain that in teaching broad outlines certain episodes or characters must be treated with considerable fulness, while in other parts the connecting links need only be slightly indicated.

It is probable that a compromise between the two plans is needed. Where the work is mainly done in periods, a rapid survey of the whole should come at the end to clinch the teaching; where, on the other hand, the work is mainly done as 'outlines,' provision should be made for more detailed study of at least one special period or subject. It is, of course, in the third stage that the period of history, whether English or foreign, and the special subject or book, are most profitably studied.

Aspects to be Emphasised.

When the general scheme of work has been drawn up, the question arises as to which aspects are to be emphasised in the chosen outlines or periods. Are we to concentrate attention on the great men or the great movements, on the history of institutions, on constitutional history or on social history? Is military history to be included or tabooed? As a general rule it seems better in the second stage to concentrate attention to a great extent on 'men and manners,' but to avoid letting history degenerate into a collection of biographies or of desultory antiquarian lore.

Another point to be considered is the vexed question of dates. In the reaction against the old idea that the learning of dates was the chief function of school history,

the pendulum swung too far and in some cases the learning of dates was almost ignored, thus making definite historical knowledge impossible. It is true that irrational, unapplied, unrealised knowledge of dates is 'mental lumber,' but an intelligent knowledge of important dates is essential to grasp the synchronism and sequence of events. Personally I feel that there is much to be said in favour of the old-fashioned practice of teaching the dates of the kings of England at a very early age. They form a very convenient framework into which later knowledge may be fitted. Some such framework needs to be built up at the time when learning by rote is easy and memory is retentive. The learning of stories about the kings in order, with their dates, seems a good transition from the stage of the isolated story to that of the continuous narrative. The idea of continuity is given, and given in an interesting way Nor is the knowledge of the deeds and characters of the kings so useless as many modern writers imply, for until recent times the history of the nation has largely depended upon the characters of the kings.

Correlation with other Studies.

Correlation with other subjects of the curriculum is sometimes valuable, but where it is attempted great care is needed that the scheme in these be not sacrificed to the scheme in history. An attempt to correlate the work in geography and history often results in an undesirable scheme in geography, and the *raison d'être* of this forced correlation disappears if the history teacher realises the vital necessity of emphasising the geographical factor in history.

A more profitable and more easily established correlation is that between the work in history and the literature lessons. Drawing often furnishes occasion for natural transitions of this kind: architectural details, armour, heraldic insignia are at once good 'copies'

and convenient pegs for illustrative instruction in history. Of course 'composition' upon historical subjects in the vernacular is taken for granted; if the boys learn Latin, Greek, French and German, or any of these, the obvious connexions between their lessons in these languages and in history will be utilised to the benefit of both orders of studies.

Schemes of Instruction. I. Actual—Chiefly French.

Before passing to a discussion of method, it will probably be useful to set out some programmes of historical study actually in use or suggested by experts. French historical scholarship may fairly claim precedence for the syllabuses which direct the history-teaching in French schools. The general aim, realised with varying completeness in different grades of schools, is thus set forth by M. Lavisse: 'To give the pupil an exact idea of the successive civilisations of the world and a definite knowledge of the formation and growth of France; to show him the action of the world on our country and of our country on the world; to teach him to render to all peoples their just due; to widen his mental horizon, and finally to leave him in possession not only of an understanding of the present state of his country and of the world, but also of a clear idea of his duties as a Frenchman and a man.' (*A propos de nos écoles.*)

The historical course in French elementary schools is as follows:

Section enfantine (age, five to seven): Anecdotes, biographies from the national history, stories, tales of travel. Explanation of pictures.

Cours élémentaire (age, seven to nine): Stories and conversations concerning the greatest personages and the principal events of the national history to the close of the Hundred Years' War.

Cours moyen (age, nine to eleven): Summary ideas on the history of France, attaching exclusive importance to the essential facts from the end of the fifteenth century to the present time.

Cours supérieur (age, eleven to thirteen): Methodical revision of the history of France; deeper study of the modern period; very summary ideas of general history; for antiquity, Egypt, the Jews, the Greeks, Rome; for the middle ages and modern times, great events studied especially in their relation to the history of France.

There are also courses in 'civics' in the last three of these four divisions of the French primary school; details will be found in the 'Organisation Pédagogique et Plans d'Études des Écoles Primaires Élémentaires' (Paris, Delalain Frères, 1905). The full syllabus in 'history and civics' prescribed officially for the higher elementary schools of France is much too long to be re-stated here, but it is of the highest interest to the schoolmaster who teaches history to pupils between the ages of twelve and fifteen. It will be found in the 'Plans d'Études et Programmes d'Enseignement des Écoles Primaires Supérieures' (Paris, Delalain). Briefly, it is thus divided:

First Year: History of France from 1500 to 1789.

Second Year: History of France from 1789 to the present.

Third Year: General history from 1789 to the present; a political and economic description of the world as it is to-day.

Under the last rubric, the following is the suggested treatment of our own country:

'Extensions of the franchise. Development of

popular instruction. The chief economic and social questions : trades unions, the 'Manchester School' free trade. Diversities of character amongst the British peoples. The religious movement. Catholic emancipation. The Irish question.' Truly an onerous task for the French primary teacher !

The classification of the French secondary schools has been stated in Part I., Section 7, above ; syllabuses in history (too long for reproduction) will be found in the *Plan d'Études et Programmes d'Enseignement dans les Lycées et Collèges* (Paris : Hachette). In *Sixième* (the lowest class of the first cycle) where boys are about eleven or twelve, the lessons present a picture in broad outline of ancient society from its appearance in Egypt down to the times of Constantine and Theodosius. A similar picture occupies the boys of *Cinquième*, the story running from Ancient Gaul to the end of the fifteenth century, while in *Quatrième* and *Troisième*, respectively, the study treats the periods between the Renaissance and the last summoning of the States-General, and this latter event and 1889.

With *Seconde* the second cycle begins and schools are divided into A, B, C and D schools as already explained ; at the beginning of this cycle the boys are about sixteen years old. The course is summarily described as follows:

Seconde.—History of Europe from the tenth to the seventeenth century ; in 'A' schools a conspectus of ancient history in addition down to the fall of Greece before the power of Rome.

Première.—History of Europe from the Regency *temp.* Louis XV. down to 1815 : 'A' schools add ancient history from the Etruscans to the Byzantine Empire of the tenth century.

In *Philosophie*, the highest class in 'A' and 'B' schools, the pupils being about nineteen years of age,

three hours a week are devoted to history; two or three hours is the *quantum* in all the earlier classes already mentioned, with the same amount of time for ancient history when that is additional to modern. In this class, history is confined to the nineteenth century, which is reviewed from standpoints constitutional, political (in the narrower as well as in the wider sense), military and intellectual. That part of the syllabus which handles the passage from recent history to the existing condition of affairs is as follows:

'*Transformation of industry and commerce.* Steam; electricity; industrialism. International routes: railways, steamer-routes, cables. *Economic development of Europe.* The great industrial and commercial Powers. *The European Powers in Africa.* Conquest of Algeria. French protectorate in Tunis. The question of Egypt. The partition of Africa. The Treaty of Berlin. French, English, Germans and Belgians in Africa. Struggle against the Treaty. *The European Powers in Asia.* Russian Asia, British Asia, French Asia. The Far East, Japan, China. *America.* Formation of the chief states of Latin America. The United States: organisation of the Federal States since 1787. Parties. Increase of territory and of population. Abolition of slavery. Economic development. Policy of annexation.

'*General characteristics of contemporary civilisation.* The armed peace. Alliances. Importance of economic interests. Imperialism. Respect for human personality; abolition of slavery and serfdom. Amelioration of penal legislation. Religious liberty; disestablishment of State religions. Political liberties: representative government, chief forms of government.

'Formation of democracies: the right to the franchise, universal suffrage, popular instruction, military service.

'Social doctrines and labour legislation.'

Most of the leading features of these French courses, particularly the employment of general history and the beginning with a mixture of myth, legend and history, reappear in most German courses. Those arranged for the Prussian schools will be found in the 'Lehrpläne und Aufgaben,' so frequently referred to in Part I. of the present work.

II. Suggested Schemes.

The foregoing are schemes in actual use; with them may be compared the suggested courses which follow. The first are from American sources.

For the Elementary School

Scheme A.—Suggested by the Committee of Seven.

Grade III. (8 or 9 years of age). Stories from Homer, Virgil, the Sagas, the Arthur Legends &c.
,, IV. Biographies of great men of all ages and countries.
,, V. Greek and Roman history to 800 A.D.
,, VI. Mediæval and modern European history.
,, VII. English history.
,, VIII. American history.

Scheme B.—Suggested by Bourne.

Grade V. Biographical treatment of American history.
,, VI. Selected periods of European history.
,, VII. American Colonial history taught as part of the contemporary history of England with its European connexions.

Grade VIII. American history since 1783.
Civics.
Growth of great states of Europe since 1815.

Proposed courses for elementary schools will be found in the Board of Education's 'Suggestions for Teachers.' In higher elementary schools the following are suitable topics for study in the last year:

Modern constitutions, the history of Europe and of the United States from 1815, the growth of the British Empire, the industrial history of England, the history of the locality.

The courses which follow have been proposed for use in secondary schools of different types.

In an essay entitled 'Rugby School—Use of the Classics' (published in his 'Miscellaneous Works') Dr. Arnold sketched a course in history which may be summarised as follows:

(1) For young children.

Simple lessons based on pictures chronologically arranged of great events in general history.

(2) For middle forms.

The reading of short but vivid histories of Greece, Rome and England.

(3) For higher forms.

The study of some historian of the first rank 'whose mind was formed in, and bears the stamp of, some period of advanced civilisation analogous to that in which we now live.' (*E.g.* Thucydides or Tacitus.)

Mrs. J. R. Green, in a paper read at a conference of the Girls' Public Day School Company, suggested the following:

Form I. English history stories.
,, II. B. Stories of Greece and Rome.

Form II. A. Stories of English history to the Reformation.

,, III. B. Stories of English history from the Reformation to the present.

,, III. A. Some General history.

,, IV. B. England to 1509.

,, IV. A. England 1509–1660.

,, V. England 1660 to present.

,, VI. Some general subject such as:

(1) The relations of England to Europe from the Reformation to the present day, including religious, social and intellectual influences.

(2) The expansion of England.

Subjects for a year's work in Form VI. suggested by Professor Firth as an alternative:

(1) Church's 'Beginning of the Middle Ages.'

(2) Seebohm's 'Era of the Protestant Revolution.'

(3) Seeley's 'Expansion of England.'

In no subject is there greater need for method in teaching than in history, and yet there is no subject in which it is less possible to dogmatise about procedure.

Method.

The danger is lest attention be concentrated on the single lesson and the teacher get into a fixed groove. Student-teachers will often say, 'I have to give a history lesson on so-and-so. What is the right way of giving it?' They seem surprised to hear that there *is* no single right way of giving it, even to the same class, and that the right way for one class may be quite the wrong way for another. The history must be brought into relation with the experience, interests and previous knowledge of the children, and the lessons must vary in plan from time to time and from class to class.

Our great difficulty is to realise in what manner historical facts and ideas appear to the children who

have not the substratum of knowledge, experience and interest into which these facts and ideas are inextricably interwoven in our own minds. Certain things appear to us to be clear, interesting and easy to remember ; to the children they may seem the reverse. They may be unintelligible to them, or, worse still, may be understood in quite a mistaken way. There is a very interesting and suggestive American book called 'Studies in Historical Method,' containing the results of experiments with regard to the historic sense and the historic memory among children, children's sense of historic time, &c. We need to be constantly making such investigations for ourselves, analysing our own remembrances of our childish ideas on history, comparing our experience with that of other people, drawing out children's ideas about history, noting and accounting for any 'howlers' we hear, and above all trying to find out the results of our own methods and modifying them accordingly.

The Historical Interest of Children.

It is of the utmost importance to understand what it is in history that interests children, for the manipulation of interest is one of the chief problems of the history lesson. The difficulty is not so much to create interest as to control it, to focus it on the important things and to divert it from the unimportant. We want to know what it is in the subject-matter of history that naturally interests children and what it is that does not appeal to them—not for the purpose of amusing them, but to guide, control and educate interest. Sometimes the important characters and events which form the subject-matter of the lesson are such as in themselves appeal to children ; sometimes this is not the case, and then we have to be exceedingly careful to present the facts in such a light that they will be interesting, and to avoid starting counter-interests in less important points of the lesson.

We want in fact to know how to arouse and how to kill interest.

Young teachers are often in danger of thinking that what interests them will necessarily interest the class, and that what does not interest them will be of equally little interest to their pupils. A student-teacher was giving a lesson on the Revolution of 1688 to a dull Fifth Standard and was advised to show them a copy of the well-known picture portraying the court of James as it was on the arrival of the news of the landing of William of Orange. 'They wanted to know the name of the baby in the picture!' she said afterwards. 'I should never have thought of wanting to know that. I should have been interested in the causes and results of the Revolution.' A more experienced teacher would have foreseen and utilised the fortunate coincidence between the girls' natural interest in a baby and the part played by the birth of the Old Pretender in bringing about the Revolution.

One day in a lesson to a junior class I remarked that after one of the Athenian victories the generals were condemned to death for allowing some of the crews to perish. This detail was introduced in the hope that the children would notice it as another example of the impulsiveness of the Athenians and their ingratitude to their great men. Up went a little girl's hand. 'Please, how did the Athenians put people to death?' This was not what was wanted, so very unwisely I answered, 'Never mind,' and went on with the lesson. In the next week I had just finished what I fondly imagined was an impressive account of the last days of Socrates, when the same child remarked with an air of the greatest satisfaction, 'Please, we know now how they used to put people to death.' It was a warning of the danger of arousing an undesirable interest and of failing to kill it by satisfying it on its first appearance.

This question of children's interest in history is a problem at which the teacher can always be working, comparing one class with another and observing the constant factor, and the varying elements. As a rule we notice, as might be expected, that children are interested in the concrete rather than the abstract, in people rather than in movements and institutions. But all people are not equally interesting to them. They like to hear of people who *do* something, whether they be heroes or villains, of 'characters whose broad lines of good and bad qualities are easily recognisable. . . . We should notice that all "good" qualities do not appeal to the child; ascetic, contemplative, passive virtues make little impression. The instinct of the child's moral nature, as of his physical, is to action' (Woodward).

Kings and queens seem more interesting to them than do ordinary mortals: they like to hear about soldiers and sailors; girls like to hear about the women of history, and the children of history are always a source of interest to present-day children. Here we have to be on our guard, for incidents in the childhood of historical characters are often more interesting to our pupils than are the great deeds of these personages in later life. Anything with plenty of story appeals to children, anything dramatic, anything with a moral. They like to have their feelings stirred, and are interested by whatever arouses laughter, admiration, pity, wonder or horror. The crudeness of their sense of humour is a trap for the teacher, whose impressive narrative is sometimes spoiled because of some point which strikes his hearers as 'funny.' Details with regard to dress, manners, and customs of bygone days arouse interest, and in fact detail generally interests children. They like the information to be exact, not vague; they want names and particulars. How long ago? how many?

how old ? are favourite questions. Children are very fond of noticing little coincidences, or analogies, *e.g.* that Edward II. and Richard II. were both deposed, that the battle of Agincourt was just 200 years after the signing of Magna Charta.

Anything connected with their own lives or experience is interesting; a child will perhaps display an unexpected interest in the story of the Princess Charlotte because 'my nurse's name is Charlotte,' or in the death of William Rufus because 'I have an uncle that lives in the New Forest.' Hence arises the value of references to the historical associations of the neighbourhood.

Where the subject-matter is of great importance and is not in itself likely to appeal to the children's interest we must be careful to kindle curiosity, to create a desire for the knowledge, or to give the opportunity for doing something, physically or mentally.

While noting and utilising the general similarity between children in their interest in history, we must not forget to allow for the exceptional pupil. The average child of eleven would agree with the girl who said that she preferred history to arithmetic because 'history is like a story and all we have to do is to remember it. Arithmetic wants a lot of thinking about.' But the exceptional child must not be forgotten who votes for arithmetic 'because you can think it out.' For such children, even at an early age, opportunity can be given in the history lesson to 'put two and two together.'

Closely allied with the question of interest is the question of memory. We want the children to leave school with a definite stock of historical information, with certain important facts and ideas firmly impressed on their minds. And yet we constantly find that the children have forgotten the essential things long before they leave school, while less important facts are remem-

bered with provoking pertinacity. The teacher needs to be constantly studying the historical memory in children as exhibited in his own and in others' pupils. It is helpful to analyse our own experience and try to discover why certain things in history seem as impossible to forget as our own names, while other far more important points seem equally impossible to remember. It is also helpful to question persons whose school-days are over, especially if they have not read history since, and to see how far their experience tallies with our own. Why is it, for example, that every one remembers the story of Alfred and the cakes, the date of the Norman Conquest, and the number of Henry VIII.'s wives?

At various times I have asked classes of training college students, who had dropped history since leaving school, to write down any six facts in English history, and to say if possible why they remembered them.

The results of such experiments generally show that the facts are remembered:

(1) Because for some reason they aroused great interest and made a vivid impression.

(2) Because a good deal of mental activity had been expended over them.

(3) Because they had been learned either at the beginning or the end of the school course.

(4) Because they had been repeated so often.

In some cases these causes are combined, *e.g.* the date 1066 was perhaps the first date learned in history; it aroused interest and made a strong impression because of its being the beginning of something, and it had been perhaps more frequently repeated than any other date.

So much of the actual instruction which schools give in history being of the 'oral' kind (that is, instruction by way of the teacher's monologue), there is a very real danger in such lessons of the instructor doing much more than his fair share of the work and the children

much less than theirs. There is also a danger that new information may be given without sufficient preparation of the children's minds. In the first place, there is a negative as well as a positive side to the preparatory work which children should be called upon to do before the teacher assumes the leading *rôle* ; it is as necessary that wrong ideas be cleared away as that right ideas be called to the front. Children are only too apt to introduce into their mental pictures of the past elements of present day civilisation. 'Veni, vidi, vici' becomes 'the *telegram* which Julius Cæsar sent home after one of his battles,' and the Anglo-Saxon Chronicle 'a magazine edited by Alfred the Great.' Anachronism is perhaps an even commoner mistake : *e.g.* stage coaches and highwaymen are referred not only to their own period, but to mediæval times as well. With regard to the positive preparation, we should remember that this may and should often take place long beforehand ; one fact may be mentioned in one lesson and one in another with reference to something which is coming many lessons ahead. An introductory lesson to a whole course may be given to awaken interest and suggest problems. Suppose, for example, that the year's work is on the period from 1689 to the present time. An introductory lesson will bring out the contrast between the British Empire now and then, the Government now and then, the social condition now and then, thus arousing curiosity as to how these changes came about.

Oral Instruction.

The two great qualities by which the teacher's instruction should be distinguished are vividness and clearness, in securing which the chief means are (1) illustrations ; (2) reference to present-day affairs and the children's own experience ; (3) reference to local history ; (4) the reading of extracts from

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historical classics; (5) the judicious use of historical novels; (6) visits to museums, historical buildings, &c.; (7) skilful use of detail; (8) quotation of the actual words of historical personages or from contemporary writings; (9) the acting by the children of historical scenes.

The term 'Illustrations' is very comprehensive. Many people, following the example of Dr. Arnold, consider that historical pictures are essential in teaching very young children. In this case it is necessary for successful class teaching that there should be a supply of large wall pictures, coloured if possible. If imaginative pictures are used they should not contain inaccuracies, as great harm may be caused by the misleading impression made by an inaccurate picture on the impressionable mind of a young child. It is quite possible to overdo the use of fancy pictures, and it is often far more satisfactory to give children illustrations of the necessary parts and then let them picture the whole scene for themselves. Illustrations of armour and costume, of ships, &c., are most useful, and fortunate indeed is the teacher who can quickly draw such illustrations on the board before the eyes of his class.

Pictures.

With older children fancy pictures are of little use, but historical portraits, pictures of buildings and places of historical interest make the past live again. The difficulty generally is to get them large enough. Where the pictures belong to such invaluable series as the Art for Schools Association's portraits, Seemann's 'Wandbilder,' or the Perry Pictures,[1] it is useful to have frames made with movable backs, so that the pictures on the walls may be easily changed to suit the lessons. It is better to mount small pictures on large sheets of brown

[1] American Agency, Croydon.

paper and leave them in an accessible place than to pass them round during the lesson. The variety of illustrations which can be obtained in picture post-cards is almost endless, and a most useful collection of illustrations can be made from pictures in newspapers, illustrated papers and magazines, especially if the co-operation of the pupils can be secured. In some schools it is the custom to have a board on which to exhibit newspaper cuttings and pictures of various sorts of historical interest brought by the children ; explanatory notes by the teacher are sometimes added. Facsimiles of old letters, documents, signatures, reproductions of old numbers of the 'Times,' medals, old coins or books, flint implements, brass-rubbings, possess obvious value which will assure them their place in a school museum, as often as opportunity occurs for acquiring them. An occasional 'lantern lesson' is a very valuable supplement to the history course, especially where classes are large.

Maps.

The constant use of maps in connexion with history lessons is essential, especially of outline maps with only the physical features marked. The necessary places, divisions, or campaigns can be put in with coloured chalk at the time, the class having when possible smaller outline maps in which they can for themselves fill in the required detail. Although maps without physical features may be employed sometimes for diagrammatic purposes, yet the frequent use of mere outline maps for historical purposes is dangerous and apt to lead to the ignoring of important physical conditions, with consequent historical inaccuracies, *e.g.* the representation of Spain as invaded across the Pyrenees where they are impassable. For teachers who are not skilled in drawing maps the 'Map Building Sheets' (Philips) and the 'Stencil Maps' of the American Agency are most helpful.

Chronological Charts.

The use of chronological charts and ' lines of time ' is a very great assistance in developing children's sense of time and in helping memory. These may in some cases be obtained in large sizes ready made, but they are probably more effective when they ' grow under the eyes of the class ' and contain only such points as are relevant to the work of that particular class. They can be copied on a smaller scale in the children's notebooks. Large charts for class use may be made on the blackboard with coloured chalks, or on linen-backed paper with coloured chalks or pencils, or on blind-holland with water-colours not put on too wet.

The simplest form is the single line of time—a vertical line marked off according to scale into divisions representing millenniums and centuries, or centuries and decades, as the case may be, with the great events written at the side in their proper places.

Such a line of time is very useful in connexion with a course of general history and should be used for Scripture history as well as for secular history. The line should be dotted and indefinite at the beginning and the end, to indicate the prehistoric past and the future ; it should be marked off clearly into millennium divisions (with such sub-divisions as seem advisable) from about 5000 B.C. to the present time. It might be made in three colours to indicate the broad division of history into ancient, mediæval, and modern, but in that case it would be well to indicate the transition periods by broken colouring. In order that such a line may be effective it must not be crowded with details. It is convenient to have one large line of time in use throughout the course with only very important events and people marked on it, and to use at the same time enlarged sections for different periods, in which more details can be introduced. A time line for English

history constructed on the same principle, but with the main divisions representing centuries instead of millenniums, can be made with great advantage when the class is taking its first connected course in English history. The line should be made in different colours to represent the different periods, British, Roman, Saxon, &c. It is probably only by such a graphic representation that most people grasp the relative lengths of various periods, and especially the relative shortness of the modern period. It is, for example, difficult to realise without diagrammatic illustration that Britain was a part of the Roman Empire for a period as long as that from the time of Henry VIII. to the present day.

In the early part of a course on general history a combination of time-lines in one chart is useful. The chart is divided horizontally into millenniums, and vertical columns in different colours represent the history of the great nations of antiquity, including the Hebrews. From such a chart the relative place of the various Old World empires and civilisations can be quickly seen.

Another form of chart consists of parallel columns, divided horizontally by century lines, &c., the columns representing the history of different countries, or different classes of events, military, constitutional, ecclesiastical, &c. The effect may be increased by using different colours for the different columns. Such a chart is described in Miall's 'Thirty Years of Teaching,' page 15.

The chart device may often be used with great advantage to show the course of a complicated war. For example: the events of the war of the Spanish Succession, or of the Seven Years' War, may be shown in parallel columns for different countries, divided horizontally for different years. It is a good thing

to let the children form the habit of arranging facts in a chart and to allow them practice in devising charts.

An ingenious and suggestive combination of chart and map is shown in E. J. Arnold's (Leeds) Synoptical Chart of the Growth of the British Empire, where, side by side, in two columns divided into centuries, are shown events in the history of the Empire, and maps of the Empire at the close of each century.

The system of chronological maps in use at the Ladies' College, Cheltenham, is explained by Miss Beale in 'The Student's Chronological Maps of Ancient and Modern History.' (Bell.) The wall century-charts at the Haslemere Educational Museum are described in the Board of Education's Special Reports, vol. ii.

Illustrative Reading.

Occasionally the reading to the class of a vivid passage from a great historian or from Shakespeare will have considerable effect, and every opportunity should be taken to encourage children to read historical classics for themselves. There is no doubt also that the reading of good historical novels helps many to realise the past. But we should be careful when recommending novels to warn children against inaccuracies and anachronisms and only to recommend books which convey an atmosphere historically correct.

Local History.

Reference to the history of the locality in which the school is situated is a great aid to vividness. Domesday Book becomes much more real if an extract referring to the neighbourhood can be read from it, a neighbouring castle is an impressive teacher of some aspects of feudalism, the Civil War in Charles I.'s reign is a different thing if the children live in a town which was besieged during the war, and so on.

Careful preparation beforehand with respect to the things that the children ought to observe must be

undertaken, if visits to museums, to historical sites and buildings, and to portrait galleries are to be as profitable as they should be. No less necessary is the 'talk' over the visit when it has been paid, or the written composition giving an account of what was seen; only so can misapprehensions be corrected in time.

Monuments.

A child who had been taken to the Houses of Parliament wrote in a composition afterwards: 'We went into the House of Lords, where there were red covered cushions. The seats in the House of Commons were not so good as those in the House of Lords. I should think that this is because the Commoners have not so much power as those who are entitled to a seat in the House of Lords.' A more profitable result of the same expedition was seen in another composition where the writer said: 'I shall never forget about the trial of Charles I., because I stood on the spot myself.'

The quotation of the sayings of historical persons or of passages from contemporary writers has great effect. Sir Thomas More, Wolfe, and Chatham seem much more real than do some of their contemporaries. Is not this largely because we are so familiar with some of their characteristic sayings? Or again, who can forget the picture of the misery of the country in Stephen's reign which is drawn in the well-known extract from the Chronicle?

Contemporaries.

Examinations often show that there is much confusion in children's knowledge and ideas. The want of clearness seems partly due to unskilful manipulation of detail. Children have little power of selection or sense of proportion; we need to make clear to them the difference between the important and the unimportant, between what must be remembered accurately and what may be safely

Clearness.

forgotten, between the facts or ideas of fundamental importance which must be remembered, and the details introduced to convey an impression or to help a generalisation. We must use every device to make the important things stand out clearly, remembering that what is very obvious to us is probably not at all obvious to a class to whom it is new. We must be careful to avoid introducing unnecessary difficulties either of subject-matter or language, and at the same time must ask sufficient questions to discover the misapprehensions of the children and to clear them away.

As pupils advance up the school, we need to be constantly stimulating them by suggestive questions, *viva voce* or written, to think about new knowledge as it is acquired and to associate it with the old. For example, a boy who hears about Themistocles and the foundation of the naval greatness of Athens will be led to compare this with what he already knows of Alfred and the English navy. Illustrations of the importance of sea-power in history will be noted in different places and compared, *e.g.* in the case of the Second Punic War, of Edward I.'s conquest of Wales, at various periods of the Hundred Years' War, in the Seven Years' War, in the War of American Independence. Instances of the effect of the long alliance between France and Scotland will be noted and associated. Facts learned chronologically will be regrouped topically. The children will be trained to notice similarities and contrasts. They will learn to use separate facts to build up a general idea of a character, being carefully warned against hasty generalisation. Thus they will begin to grasp some of the dominant facts and leading ideas of history.

In the earliest stage the lessons are generally entirely oral. In the middle stage they fall, generally speaking, into two classes. In the first class the oral lesson is the basis of the work and is supplemented by a text-

book or summary. With children up to thirteen or fourteen who have not acquired any great facility in reading, or skill in using a book, a teacher with a good knowledge of history and any power of vivid narration will probably prefer to teach orally for the most part, only letting the children read the text-book afterwards to strengthen the impression of what has already been heard. The danger of using the text-book as the basis is that the children's attention is apt to be diverted from the matter to the language, and that misapprehensions may arise through misunderstandings of words and phrases which would not occur had the child already heard the gist of the matter. Also children find it difficult to discriminate between the important and unimportant in a book, and are apt to 'learn' so many pages in an unreflecting manner if left to their own devices. So difficult is it to get a text-book exatcly suited to a particular class that some teachers prefer to have only a printed summary, or primer.

Use of Text-Books.

In the second class of lesson the text-book is the basis, and is supplemented by the oral lesson. With pupils from fourteen to sixteen such lessons are often useful, for it is important to teach the way to use a book. It is sometimes advisable to give preparatory questions to guide the pupils in their reading, and it is always necessary to ascertain by careful subsequent questioning that they have grasped and understood what they have read.

Note-taking.

The art of note-taking is a difficult one, and the children need to be carefully trained in it. It is a very dangerous practice to let them scribble down in pencil untidy and unsystematic notes of their own composition to be learned or copied out afterwards. On the other hand, it is not good to spend much time in writing notes from

dictation. From quite early years children can be trained to take part in the building up of blackboard summaries, making suggestions with regard to the selection of facts, and learning how to arrange them with brevity, clearness, and symmetry.

It is often a good thing to let the children copy the summaries, but it is important that these note-books should be inspected, as it is surprising to discover what mistakes children can make in 'copying from the board.' With older pupils it is well to give practice and criticism in making notes on a book, or on a certain topic as treated in different books. The foregoing recommendations on note-making apply *mutatis mutandis* to graphic as well as to verbal notes, to maps, charts, plans, and diagrams.

Writing.

The amount of written work to be exacted must depend on many things. But if written work is set it must be carefully corrected and time must be allowed for the corrections to be 'gone over' with the class. There is no more deplorable waste of time than to spend hours in correcting piles of exercises, when the corrections are ignored, and the same mistake made over again at the first opportunity.

Where time allows it is often a good plan to have a question prepared as home-work, and written without reference to books, in a definite time, in class. With younger children, short definite questions are usually the best. If they write long answers, much of the time of the history lesson has to be spent in explaining mistakes of expression, composition, and grammar. With older pupils practice is needed in such questions as 'describe the character of,' 'explain the importance of,' 'summarise the policy of,' 'compare and contrast.' It is surprising to find how badly such questions are answered without considerable practice. Historical compositions

requiring imagination and invention may be set with advantage from time to time, such as imaginary speeches, letters, conversations and debates.

Questions involving very much abstraction and careful definition should not be attempted too early. A great deal of time is wasted by giving at too early a stage questions such as the following. 'What was Feudalism?' 'What was the Renaissance?' Children can know a good deal about Feudalism and the Renaissance long before they are fit to appreciate a definition of either, far less to frame one of their own.

Plenty of time should be allowed for revision lessons, which ought to be as interesting and effective as possible.

Revision.

Various means can be employed for this end, but two in particular have been found very successful. In what may be called 'the story-without-name method' I have described some of the principal events or people in the period under revision as vividly and tersely as I could, mentioning no names. The children have had to give the necessary names and dates, and when, and only when, the whole class have known them, have we gone on to the next story. Sometimes I have let the children write out these stories without names themselves, and have read the best to the class, the writer being expected to be able to supply the names if the class cannot.

Another method which interests the children is to allow them to prepare examination papers on what they consider the important points of the period, the best questions being put to the class, and the answers corrected if necessary by the writer.

With very young children I have written out cards, one set with names of people or events, another with a short account of these, perhaps a third set with dates. The revision lesson has then been a game with these cards.

Examinations, if properly managed, may be of great help both to teacher and pupil, but otherwise they may have a very injurious effect. The papers should be carefully set, covering the work fairly, allowing scope for the dull pupil who has worked hard, and also for the clever pupil. The questions should deal with really important matters, should be quite clearly worded, and should be carefully calculated so that the majority of the class can finish them in the time allowed. They should be convenient to mark and of as interesting a form as possible. Such questions should be avoided as 'What do you know about' or 'Write notes on' followed by a miscellaneous collection of names of persons, battles, and laws.

It is important that terminal examinations should be held long enough before the end of term for the teacher to go over the paper thoroughly and effectively with the class, and to note the lessons to be learned by himself with regard to methods from the strength and weaknesses of the answers.

FOR FURTHER READING.

H. E. Bourne, *The Teaching of History and Civics in the Elementary and the Secondary School*, pp. 381. Longmans, 1903. 6*s.*

Committee of Seven, *The Study of History in Schools.* Report to the American Historical Association, pp. 255. Macmillan, 1903. 2*s.*

Mary Sheldon Barnes, *Studies in Historical Method*, pp. 144. Isbister, 1897. 3*s.* 6*d.*

H. L. Withers, *The Teaching of History, and other Papers.* Manchester University Press, 1904. 4*s.* 6*d.*

F. W. Maitland and others, *Essays on the Teaching of History.* Cambridge University Press, 1901. 2*s.* 6*d.* Contains, among other papers, 'The Teaching of History in Schools: Aims' (W. H. Woodward, pp. 69-78); 'The Teaching of History in Schools: Practice' (C. H. K. Marten, pp. 79-91).

James Welton, *Principles and Methods of Teaching.* Clive, 1906. 4*s.* 6*d.* Pp. 221-275, 'The Teaching of History.'

C. Cookson, *Essays on Secondary Education.* Clarendon Press 4*s.* 6*d.* 'The Teaching of Modern History—I.,' C. H Spence, pp. 161-176. 'The Teaching of Modern History—II.,' A. L. Smith, pp. 177-195.

P. A. Barnett, *Teaching and Organisation.* Longmans, 6*s.* 6*d.* Contains 'The Teaching of Ancient History,' H. L. Withers ; 'The Teaching of Modern History,' R. Somervell.

J. J. Findlay, *Principles of Class Teaching.* Macmillan, 1902.

Oskar Jäger, *Didaktik und Methodik des Geschichtsunterrichts.* Munich, 1906. 2*s.* 6*d.*

Langlois et Seignobos, *Introduction aux Études Historiques.* Appendice I., 'L'enseignement secondaire de l'Histoire en France,' pp. 281-292. Hachette, 1898. 3*fr.* 50*c.*

A. Pizard, *L'Histoire dans l'Enseignement Primaire.* Paris : Delagrave, 1894. 2*fr.*

Board of Education, *Special Reports.* Vols. III. and IX. *re* Germany ; Vol. VI., Article on 'History in the Preparatory School.' *Suggestions for the Consideration of Teachers* Chap. VIII. and Appendix IV. Wyman, 1905. 8*d.*

M. E. Woods, *Report on the Teaching of History in the Schools of Germany and Belgium*, pp. 71. Macmillan, 1902.

W. M. Childs, *Teaching of History in Schools.* University College, Reading. 6*d.*

H. L. Powell, *The Teaching of History.* (Association for the Education of Women, Oxford.) 6*d.*

Historical Association Leaflets (Secretary, Miss M. B. Curran, 6 South Square, Gray's Inn, W.C.). Free to members. 6*d.* each to non-members.

1. 'Source Books.'
2. 'Some Books on the Teaching of History in Schools.'
3. 'Historical Examinations affecting Schools.'
4. 'Address on the Teaching of History' (Bryce).
5. 'Bibliography of British History for Teachers.'
6. 'Books upon General History, Ancient History, and European History.'

Also—

'Outlines *v.* Periods' (Tout) ; reprinted for the Association.

In preparation :

(*a*) Bibliography of Colonial History.
(*b*) Illustrations.
(*c*) Original authorities, bibliography for teachers, &c.

F. J. C. Hearnshaw, *Some Defects in the Teaching of History in Schools.* 'School World,' January, February, April, 1907.

J. Nield, *A Guide to the Best Historical Novels and Tales.* Putnam. 4*s*. net.

Courthope Bowen, *Descriptive Catalogue of Historical Novels and Tales.* Stanford, 1905.

E. A. Baker, *History in Fiction : a Guide to the Best Historical Romances, Sagas, Novels, and Tales.* 2 vols. 2*s*. 6*d*. each. Routledge, 1907.

Local History Reading-books : Methuen's Series, School County Histories : 'School History of Middlesex,' &c., 1*s*. 6*d*. each. E. Arnold's Series : Story of London, of the North Country, &c., 1*s*. 6*d*. each. W. M. Childs, 'School History of Reading.' Miss Short, 'School History of Exeter.' Meiklejohn's 'London.' 'The Glory of London,' Black, 1*s*. 6*d*. 'London, Historical and Descriptive,' Blackie, 1*s*. 6*d*.

Easy Reading-books on General History : 'Gateways to History' Series, 'Friends of the Olden Time,' 'Men and Movements in European History' (E. Arnold) ; 'The Story of the World' Series (Blackwood) ; 'Heroes and Heroines of European History' (Longmans) ; 'Heroes of European History' (Blackie).

SECTION V

MATHEMATICS

In a discussion arising out of the report on the improvements which may be effected in teaching mathematics, presented to the British Association in 1902, Professor Perry remarks that the Anglo-Saxon boy has never been educated except through the senses. The truism might with advantage be more generally recognised in lessons on mathematics. No subject in the school curriculum stands in greater need of presentation on kindergarten principles, and at the same time commands such wealth of illustration. The successful teacher of mathematics recognises this. His lessons compel interest and secure ready reception by his constant appeal to experience, and judicious reference to the history of his subject. To him some apology is due for the trite and obvious in the following remarks. These describe methods which have been found helpful in the class-room, and which may be of service to those who are ill-content with the results achieved by their pupils. If the notes suggest, as they probably will, other and more appropriate methods, all the better; for as soon as any one method becomes crystallised, it loses its efficiency. Since the simplest principles are those most in danger of being overlooked, a considerable space is devoted to the elementary portion of the work, especially in arithmetic.

Arithmetic.

No small variety of numerical operations is involved in a child's experience gained outside the school curriculum and even before the period of school life. But the details of this experience often escape the notice of the adult, unless sympathy with children has given him insight into children's ways. Hence, on the one hand, a teacher is apt to assume that his pupils have somehow become acquainted with the principles of arithmetic; on the other hand, he makes little appeal to experience in his lessons on number. Divorced from objective fact, arithmetic is presented as a set of dry rules lacking the stimulus of interest. After more or less persistence on the part of the teacher, the pupils with dull indifference acquiesce in the daily drill which aims merely at rapidity and accuracy in calculation.

School and Life.

This gulf which, in arithmetic, separates school experience from general experience reveals itself to a casual observer in numberless instances. In his games, for example, the child counts, his gains and losses are balanced with rigid accuracy. In the school, counting is rarely systematised and extended, and the learner hesitates to shorten a process in simplification by the mutual extinction of equal quantities with opposite signs. The very language of numeration successfully hides the significance of the decimal notation, the fundamental principle of which comes as a revelation to the learner only after using a scale other than the denary, while the natural extension of the denary system to express fractional quantities is regarded as a new rule. Again, the pupil picks up stray notions of the Roman system of notation from clock faces and chapter headings. His knowledge needs codifying. A single lesson on the system would demonstrate its economy in symbols, its Janus-like convention of place value,

whereby a digit becomes subtractive or additive according to its position before or after a digit of higher numerical importance. A single exercise, worked in both notations, would not only demonstrate the clumsiness of the one in operation, but compel attention to the beautiful simplicity of the principle underlying the other. This failure to correlate general experience with number exercises becomes more conspicuous when one examines the order in which the subject-matter of arithmetic has been presented. In the elementary school a pupil of ten years of age used to be introduced to 'weights and measures,' a year later he was ripe for 'fractions,' still later he learnt (in school) to strike an average. The tendency of recent syllabuses towards better method is most welcome. In their 'Suggestions for the Consideration of Teachers' the Board of Education put forward specimen schemes of teaching arithmetic in which the old topical arrangement of previous schemes is abandoned in favour of an order of presentation governed by fuller recognition of the pupil's general activities. It is assumed that some at least of the units of weight, time, and space are familiar at an early age, that easy common fractions are not too difficult for a child who is often concerned about the equal distribution of his own or his neighbour's property, that though the word 'average' is not yet in his vocabulary, he knows how to 'take one with the other' as well as his elders. This appeal to experience is needed not only in the earlier work, but throughout the arithmetic course. Practical acquaintance with units of measurement, visualising quantities and processes when possible, use of squared paper in mensuration, and the like: all ensure progress in the theory of arithmetic, and by fostering mental alertness promote skill in the art. And because arithmetic is an art as well as a science, instruction in theory must be followed by frequent practice, both oral and written. The proportion of time

devoted to each must depend on the teacher's judgment of the needs of his class. With young pupils it is safe to devote at least half of the available time to practice.

The following notes suggest methods of presentation which have been found valuable in practice. They emphasise the importance of the earlier work by the comparatively large space devoted to it.

Counting.

Like savage man, the child begins to number by counting objects placed before him. It matters not what they are, provided they can be withdrawn when a given series is mastered. Convenient stages are as far as ten—twenty—fifty—to a hundred; in each stage he advances by unity and learns to retrace his steps. Then he advances by tens to a hundred. The significance of the suffixes -ty and -teen is pointed out. He attempts an easy stage by twos, threes, and fours.

Analysis of Numbers.

A part of each lesson is devoted to analysing numbers as far as ten. Taking 6 for example, he repeats 1 and 5 are 6, 2 and 4 are 6, 3 and 3 are 6. A table showing all possible pairs of integral components of numbers from 2 to 10 is known as 'The Forty-five Combinations.' It should be memorised with as much care as the Multiplication Table, so thoroughly, indeed, that any two digits being named, their sum is at once suggested without counting. At first the abacus, Tillich's bricks, or the Number Table from 0 to 109[1] will be used *as aids to computation*. At this stage varied illustration is unfavourable to mental concentration, and should be avoided; whatever aid is used should be withdrawn

[1] The numbers as far as 109 are arranged in eleven vertical columns, the first ranging from 0 to 9, the next from 10 to 19, the last from 100 to 109. Unless the learner is early accustomed to the last column he will afterwards find in the number 100 a barrier difficult to overleap.

as soon as possible. In the written exercises accompanying the oral work, the pupil is confronted with the principle underlying the decimal notation. Special care must be taken to make him understand the use of the tens column, and then the hundreds column. The number 16 being written, he will name each digit: 'one ten,' 'six ones,' and he will know by how many the one exceeds the other in value. The symbols +, −, and = will lessen the labour of writing. To express 4 and 2 are 6 he will write $4+2=6$, to express 6 less 4 are 2 he will write $6-4=2$.

Addition.

Exercises now become more difficult: counting forward and backward will be continued; but the intervals will be gradually widened to nine and eleven. Special use should be made of series of the following types: $7+4$, $17+4$, $27+4$, &c.; $51-3$, $41-3$, $31-3$, &c.; the difficulty being to leap the nearest tenth number. Columns and rows of numbers will be totalled from opposite ends to show (*a*) that the sum of quantities is not affected by their order in addition, and (*b*) that like must be added to like, 'ones' to 'ones,' 'tens' to 'tens,' and so on. Long tots should be broken into convenient sections, each section totalled, and the sum of these totals used to check the grand total.

Subtraction.

In subtraction three methods are open to the teacher—decomposition of the greater number, equal additions to both numbers, or 'complementary addition.' Mere decomposition is simple enough, but it is difficult for the child to determine what amount of decomposition is necessary. For example: Take 357 from 536.

$$536=4 \text{ hundreds}+13 \text{ tens}+6 \text{ ones}.$$
$$357=3 \text{ hundreds}+\ 5 \text{ tens}+7 \text{ ones}.$$

Decomposition has not been carried far enough; a further step is taken:

$$\begin{array}{l} 536 = 4 \text{ hundreds} + 12 \text{ tens} + 16 \text{ ones.} \\ \underline{357 = 3 \text{ hundreds} + \ \ 5 \text{ tens} + \ \ 7 \text{ ones.}} \\ 179 = 1 \text{ hundred } + \ \ 7 \text{ tens} + \ \ 9 \text{ ones.} \end{array}$$

The method of equal addends avoids a complex analysis, but involves a preliminary exercise as easy to understand as it is difficult for the pupil to express concisely. It is assumed that 10 ones = 1 ten, and that 10 tens = 1 hundred. By experiment or otherwise[1] the pupil learns that when one number is to be subtracted from another, if both are increased alike, the difference between the increased numbers is equal to the difference between the original numbers.

The exercise then appears in this form: but it will be noted that 646 − 467 has been substituted for the original exercise 536 − 357.

$$\begin{array}{l} 5 \text{ hundreds} + 13 \text{ tens} + 16 \text{ ones} \\ \underline{4 \text{ hundreds} + \ \ 6 \text{ tens} + \ \ 7 \text{ ones}} \\ 1 \text{ hundred } + \ \ 7 \text{ tens} + \ \ 9 \text{ ones} \end{array}$$

By the third method the greater quantity is regarded as the sum of two addends. The less quantity is one of these addends, the other is its 'complement' with respect to the greater. This complement is supplied column by column, beginning with the units. In each column the upper digit (increased by 10 if necessary) is the sum to be produced in that column. The lower digit is one component of the sum. The other component is instantly suggested by the Table of Combinations (see p. 289). The method favours rapid work, and would be more generally used if the table of combinations ranked with the multiplication table in its claim to be memorised.

[1] The 'age' illustration commends itself to children. Tom is 7, Ann is 4. In ten years' time Tom will still be three years older than Ann.

Taking the example already given, the pupil repeats '7 and *nine* are 16,' emphasising and writing the 'nine. One and five are six, and *seven* are 13. One and three are four, and *one* are 5.

By whatever method subtraction is taught, the pupil soon produces correct results without regard to theory. The teacher readily acquiesces, postponing the demand for a reasoned process. Purists in method may demur to the production of mechanical results; but they will remember that man wore clothes before he could explain why they kept him warm, and that it is not altogether unnatural for childhood to take on trust statements which later experience will verify.

A curious use of the language of loans to express processes in subtraction should be noticed—viz. 'borrowing' and 'paying back.' Borrowing suggests decomposition of the greater number. Paying back suggests the method of equal addition. The use of the two suggests confusion, moral as well as mental, for honest folk repay where they have borrowed. It would be interesting to learn who first blundered into this unhappy combination. Its persistence in the class-room is less creditable than credible.

The series of multiples contained in a 'table' has already been learnt in addition. It remains to connect each member of the series with its factors. The following ways of teaching a 'table' show that in arithmetic multiplication is a short way of getting the sum of like numbers.

Multiplication Table.

1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9
2	4	6	8	10	12	14	16	18

The pupil adds, and when all the sums are found, repeats the table in the usual way.

A table constructed thus is a useful complement to the former:—

1	2	3	4	5	6	7	8	9
								2
							2	2
						2	2	2
					2	2	2	2
				2	2	2	2	2
			2	2	2	2	2	2
		2	2	2	2	2	2	2
	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2
2	4	6	8	10	12	14	16	18

The pupil says, for example, 'two, four, six—three twos are six'; 'two, four, six, eight—four twos are eight.' He should construct the table for himself. If squared paper is not available, 'dot pictures' of products should be made, *e.g.*

$$20=4\times5 \qquad \begin{array}{ccccc} \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \end{array}$$

By means of these he learns the commutative law of multiplication, the meaning of the terms 'factor' and 'composite number,' and prepares for the transition from lineal to surface measurement. Frequent repetition of the table enlists the co-operation of the ear as an aid to memory. When any pair of factors automatically suggests their product, then only is the table 'known' and ready for service. A distinct stage in progress is marked by the acquisition of the combination and multiplication tables. Inaccuracy in subsequent work is often to be traced to a treacherous memory.

Multiplication.

Abbreviated methods will be encouraged if partial products are named. Occasionally it is desirable to vary the order of multipliers, and thus prepare the way for abbreviated multiplication of decimal fractions—*e.g.* (*a*) 765×198, (*b*) 159×137.

(*a*)

$$\begin{array}{l} \underline{765 \times 198} \\ 765 \times 200 = 153{,}000 \\ \underline{765 \times \quad 2 = \quad 1{,}530} \\ 765 \times 198 = 151{,}470 \end{array}$$

(*b*)

$$\begin{array}{r} 159 \\ \underline{137} \\ 15{,}900 = 100 \times 159 \\ 4{,}770 = \;\; 30 \times 159 \\ \underline{1{,}113 = \quad 7 \times 159} \\ 21{,}783 = 137 \times 159 \end{array}$$

Division.

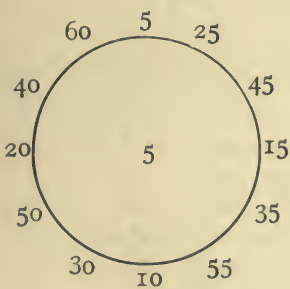
It is unfortunate that text-books rarely distinguish two processes covered by the term 'division': measuring and sharing (*messen und teilen*). We take a foot-rule and measure it by means of a pencil five inches long. The pencil is placed on the ruler twice. We say a length of five inches 'measures into' twelve inches twice, and two inches remain over. (We leave these inches over, not expecting the pupil at this stage to remark that they contain the measure two-fifths of a time.)

We take another foot-rule, and, proposing to divide it into five equal parts, we ask how long each part will be? Ten inches of the ruler divided into five equal parts give two inches for each part. Each of the two remaining inches may be divided into five equal parts (fifths). If one part is taken from each inch to increase the two-inch share already obtained, the latter becomes two inches and two-fifths of an inch.

The operations on these two rulers are entirely different, different language has been used to describe processes and results, different effects are produced on the objects.

It has been proposed to use the signs : and $\div$ for measuring and sharing respectively, to be read thus: 20 : 5, twenty measured by five; $20 \div 5$, twenty shared by five. The question for the teacher is, 'Which operation is to be taught first?' The pupil's vocabulary already covers language appropriate both to measuring and to sharing. In sharing, language appropriate to fractions is used, and a preparatory lesson is necessary to illustrate halves, thirds, &c., and their conventional notation, $\frac{1}{2}$, $\frac{1}{3}$, &c.

These considerations determine the order. Measuring comes first, and it will be wise to give considerable practice in it before proceeding with sharing. Diagrams and exercises framed on these models will be found useful.



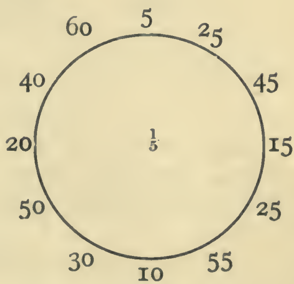
Measuring

5 times 4 are 20.

How many times is 4 contained in 20?

What number is contained five times in 20?

What number contains 4 five times?



Sharing

$\frac{1}{5}$ of 20 is 4.

What part of 20 is 4?

Four is the fifth part of what number?

What number is one-fifth of 20?

What number is two-, three-, four-fifths of 20?

The first exercises in division will be oral, and based on the multiplication table.

If the practice of naming each part of a process is adhered to, as in the following examples, no difficulty can arise with respect to remainders, and no room is left for 'rule of thumb': (*a*) $30187 \div 105$. (*b*) Find the 15th part of 17*s.* $9\frac{1}{4}$*d.* (*c*) If 19 eggs are packed in a box and 2976 eggs are to be packed, how many boxes will be wanted?

Division by Factors.

(*a*)

$$105\left\{\begin{array}{r|l} 3 & 30187 \text{ units} \\ 5 & 10062 \text{ groups of } 3 \text{ r. } 1 \text{ unit} \\ 7 & 2012 \quad ,, \quad 15 \text{ r. } 2 \text{ groups of } 3 \\ & 287 \quad ,, \quad 105 \text{ r. } 3 \quad ,, \quad 15 \end{array}\right\} \text{r. } 1 + 6 + 45 = 52$$

(*b*)

$$15\left\{\begin{array}{r|lll} & s. & d. & \\ 3 & 17 & 9\frac{1}{4} & \\ 5 & 5 & 11 & \text{r. } 1f. \\ & 1 & 2 & \text{r. } 4f. \end{array}\right.$$

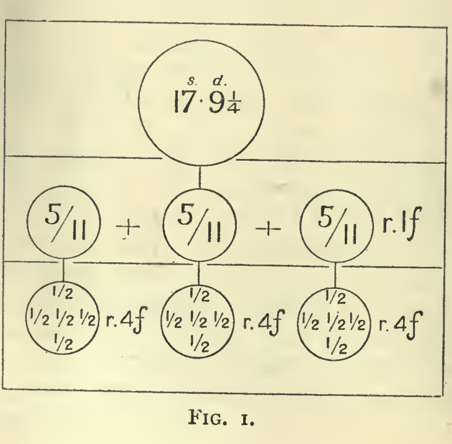


FIG. 1.

17*s*. 9¼*d*. divided into three equal parts, each 5*s*. 11*d*. r. 1*f*. In practice, only *one* of the 5*s*. 11*d*. shares is divided into five equal parts, giving 1*s*. 2*d*. and r. 4*f*. We know that the other two 5*s*. 11*d*. shares will give parts and remainders of the same value. The total remainder will be $(3 \times 4 + 1)$*f*. or 13*f*. The operations are visualised in the diagram.

(*c*)

```
                 156 boxes
        Eggs 19) 2976 eggs
                 19   hundreds
        A . . . .107  tens
                  95  tens
        B . . .  126 ones
                 114 ones
                  12 ones
```

If the process in (*c*) is understood, pupils readily reply to such questions as these :—

(At A and B) How many eggs have been packed ?
How many boxes have been used ?
How many eggs remain to be packed ?

(At the end of the exercise)
How many eggs remain over ?
How many more eggs are wanted to fill 157 boxes ?
How many eggs can be packed in 156 boxes ?
How many boxes are wanted if twice the number of eggs are to be packed ? How many remain ?
How many boxes are wanted if twice the number of eggs are to be packed and 38 eggs put in each ? How many remain ?

Weights and Measures.

The teacher will not confine himself to abstract quantities when framing examples in the fundamental rules, but will recognise the experience pupils have already gained of the commonest units of measurement. In a general way the value of the yard, pound weight, quart, day will be known, also their relations to some of their multiples and sub-multiples. Again, through the medium of home life the pupil has become familiar with the names, appearances, and relative values of most of the coins in use. By means of measuring exercises with the multiplication table he has already made a two-way passage between pairs of adjacent units. In extending and systematising knowledge thus gained, a convenient sequence for study will be: Money, length, capacity, weight, and time. Natural love of activity, clearer perception of the utility of the work, interest aroused by a wider range of illustration, combine to make 'weights and measures' an interesting stage in arithmetic. The first exercises will be purely experimental, tables of units will be constructed as far as possible from direct observation, the material for which will be found in a well-equipped school. No elaborate apparatus is wanted. A balance and set of weights will be the most expensive items. A spring balance for testing estimates of weights costs but a few pence. With a scale pasted on a wall, a set-square, a tape measure, pupils will find their height and chest measurement. Dimensions of the class-room may be conspicuously displayed. Approximate determination of longer but familiar distances by walking will interest the pupil who has ascertained the average length of his walking step. A peck of sand, a gallon of water may be measured with a quart jug or half-pint cup. A model clock face is indispensable in exercises on time. Formal lessons on units of measurement

will be given, in which the nature and function of a unit, its origin, the arbitrary choice determining it will be discussed, also the need for its general acceptance, conformity to standard and convenience. When using the time-honoured name 'weights and measures,' it will be pointed out that a pound, foot, gallon, day are all measures, measures of gravitation or space or time.

In examples set for practice, incongruous combinations will be avoided. Sometimes one sees an extraordinary range of units in avoirdupois table employed to express the weight of a single object, as if a merchant dealing in tons should at the same time take account of drams.

While insisting once more on the provision of actual units for practical work, an instructive instance may be given of the consequences attending neglect of this provision. For more than a generation the public has from time to time been advised of the coming of the kilogram. Educational authorities have decreed that the metric system should be taught in their schools. Admirable charts have been produced to illustrate the units. Had the metre scale, the kilogram, the litre measure been freely handled in the class-room from the first, the present generation would be better able to judge of the merits of the system, opposition to it would be founded solely on mathematical and financial considerations, any prejudice arising from want of familiarity would have been eliminated. As it is, the kilogram has not arrived.

Reduction.

In an oral lesson twenty-four farthings would be readily given as the equivalent for sixpence, but a difficulty presents itself to the thoughtful pupil when he represents the reducing process on paper, especially if he has been carefully trained to label the quantities dealt with. Why should sixpence when multiplied by 4 yield twenty-

four farthings? Why not twenty-four pence? Of course, it is the 'number' of pence which he multiplies.

$$\begin{array}{r} 6\text{d.} \\ \underline{4} \\ 24\text{f.} \end{array}$$

As 1 penny=4 farthings, it will be readily seen that when a sum of money is expressed first in pence and then in farthings, there must always be four times as many farthings as pence. The point should be occasionally referred to when reducing from higher to lower units. The reverse process of reduction from lower to higher units is to be regarded as an exercise in measuring division. Short cuts must not be discouraged by too formal a method. Suppose it required to express in pounds avoirdupois 3 cwts. 2 qrs. 17 lbs. If trained by flexible methods the pupil will probably write:

$$\begin{array}{lr} 3 \text{ cwts.} = & 336 \text{ lbs.} \\ 2 \text{ qrs.} = & 56 \text{ ,,} \\ & \underline{17 \text{ ,,}} \\ & 409 \text{ lbs.} \end{array}$$

Area and Volume.

Simple exercises in area and volume will follow demonstration lessons in which correct ideas of space relations are developed by means of squared paper and cubes. The pupil is introduced to a new method of estimation. Hitherto he has measured length by length, weight by weight, &c. He is at first surprised to find that surface is not measured by surface, nor volume by volume. Give him a piece of paper, one inch square, and ask him to measure a small area with it; or let him try to find the 'content' of a box by means of an inch cube. He will gladly seek relief, in the first case, by marking off lineal inches in two directions at right angles, forming inch squares by drawing lines through the points of division, and finding the number of squares by multiplying the number of lineal inches in the length by the number of lineal

inches in the breadth. The result should be regarded as a pure number indicating how many squares have been formed. In the second case, after experiments in building up rectangular blocks with smaller cubes, he will be led to form for himself the rule for finding the volume of a rectangular space by finding the product of three lineal dimensions.

Here, if anywhere in arithmetic, the teacher must hasten slowly. The pupil's facility in manipulating factors will otherwise lead him to give results the import of which he does not thoroughly understand. The transition from the expression of space of one dimension to the expression of space of two and three dimensions is not easily made. The adult is apt to overestimate the apperceptive ability of the young learner. Those who would be in sympathy with his difficulties would do well to read that amusing little book 'Flatland,' in which a denizen of two-dimensional space vainly tries to make himself intelligible to a dweller in space of one dimension, and loses himself in abstruse speculations as to the nature of a higher order of beings who are said to exist in space of three dimensions.

The relations between units of surface and volume will be deduced from the relations of lineal units. If 12 inches = 1 foot, then 12×12 sq. in. = 1 sq. ft., and $12 \times 12 \times 12$ cub. ins. = 1 cub. ft.

Estimating Magnitudes.

Some persons show remarkable skill in estimating magnitudes with tolerable accuracy. Without unduly emphasising the educational value of this desirable accomplishment, it may be well to foster it. Such a list as is here given may be used for reference. *Length.*—A halfpenny is one inch in diameter; the height of four courses of brickwork is one foot; a cricket pitch is twenty-two yards, or one chain; the distance between extreme finger-tips when the arms of a man are out-

stretched, six feet or one fathom. *Area.*—An acre may be represented by a space ten chains long and one chain broad, or better still, two chains by five chains. *Weight.*—Ten farthings or five halfpennies or three pennies weigh one ounce; half a pint of water weighs ten ounces, a gallon weighs ten pounds; a cube of granite with 2′ 6″ edge weighs nearly a ton; a cubic foot of water weighs a thousand ounces. In addition to these, the heights of familiar buildings may be given, the furlong and mile should be known by reference to the distance between well-known points in the neighbourhood, and the pupil should find out how long it takes him to cover these distances when walking or running. Such a list can be extended at pleasure: its use will illustrate the work done inside the school, and add to the interest of life beyond its walls.

A principle of considerable importance may here be illustrated. From the measured magnitude or weight of a known aggregate of units the magnitude and weight of an individual component may be determined with greater accuracy than is possible by measuring single units. If 500 leaves of a book are together one inch thick, and weigh a pound (av.), each leaf weighs one five-hundredth of a pound, and is, approximately, one five-hundredth of an inch thick, possible air-spaces being disregarded. It is worth noting that pupils accustomed to absolute accuracy attending operations with abstract numbers invariably assume the possibility of similar accuracy in weighing and measuring. Without lessening his regard for the former, it may be well to anticipate the revelation he will experience in laboratory practice at a later period. The same distance measured by different pupils, or by the same pupil at different times, will be variously estimated. It is but a short and obvious step to the

recognition of the further principle that the mean result of several estimates is the safest.

Units of Space.

Teachers will generally concede that the space here devoted to that branch of arithmetic which deals with units of space is justified by the demands which more formal mensuration will presently make. If anyone doubts the need for detailed exposition, let him require a class to write down offhand the number of faces, edges, solid and plane angles in a rectangular block, and note further how many take the dimensions of such a block by measuring the three edges which meet at one of the solid angles.

Recapitulation.

It is, of course, a mistake to confine the pupil rigidly to exercises in the new rule which he happens to be studying. Recapitulation must be attended to, but it may be made the basis of further acquisition. For instance, on p. 295 it is suggested that the learner who knows the first twelve multiples of five should be practised in giving two-fifths, three-fifths, &c. of these multiples after he has recognised the value of one-fifth. Such an exercise may be regarded as his introduction to the unitary method of working so-called 'rule of three' sums. Exercises involving division and multiplication take him a step beyond. He will without further instruction answer such a question as this: If two hats cost 15*s*., what should three similar hats cost?

Problems.

In going over rules in multiplication and division the value of these operations as mutual tests of accuracy may be noticed, the pupil of course recognising that the chance of error in the 'test' prevents its being conclusive as to the accuracy of the result tested. It may be well to frame exercises which recognise that quantities are not always

divided into equal parts—*e.g.* divide the number 27 into two parts so that one shall be double the other; divide 2*s.* 6*d.* between a boy and a girl so that the girl shall receive 7*d.* more than the boy. Such examples present little difficulty if only oral answers are required, and if only small numbers are involved. But 'the written expression of sums that can be easily performed mentally presents great difficulties to the child,' and this written work becomes increasingly important now that mechanical readiness in the elementary rules has been secured. Power to analyse a printed question is developed with difficulty, even though the question itself is expressed in simple language, and deals with easy numbers. Mental inertia may be stimulated into activity by the conversational style of oral exercises; difficulties of another order beset the path of a pupil who is learning to record on paper his attempts to solve a problem presented to him through the medium of a cold unsympathetic letterpress. Confusion of data and quæsita is the first infirmity of even the alert mind. The habit of coolly setting down in proper sequence successive steps in a process comes as slowly as the habit of walking. Even the facility already acquired in elementary operations becomes a hindrance. The pupil is ready to add, subtract, multiply, or divide with distressing impartiality and fine disregard of the conditions of the problem. Left to himself, or tutored by a teacher who esteems correct results before methods of procedure, he plunges headlong into a numerical lottery and trusts to chance for the answer. To meet these difficulties unfamiliar terms or ideas contained in the question are first explained. It is a good plan to give a collection of varied problems as an exercise in reading. At the end of each question the pupil says, 'I am told so and so,' 'I am asked so and so.' The answer will be so and so,

no attempt to solve being made. Such a practice tends to become mechanical in itself, but at least much practice and some progress towards analysis will have been secured.

Orderly sequence is encouraged by insisting that the quantities in successive steps shall be accurately named. An unnamed line must be regarded as a signal of distress on the part of the pupil—a silent witness to unintelligent effort. The method of dealing with errors deserves special attention. To ensure success in teaching arithmetic, problematic or otherwise, it is not enough to point out incorrect figures in a result. The question for the teacher is, Why did the pupil, who presumably wishes to arrive at a correct result, make this or that particular error? Until this is discovered there is no guarantee that the error will not be repeated. Besides being of obvious utility to the pupil, its discovery often discloses interesting processes of the child mind. The pupil will himself plead guilty to contributory negligence when errors can be traced to ill-shaped figures, slovenly arrangement, and, most exasperating of all, a common habit of defacing an incorrect figure by inscribing the correction *upon it* instead of by its side; but errors due to misconceptions may be more frequent than the teacher suspects. He cannot afford to disregard these eloquent libels on his skill. The impossibility of dealing with the errors of every individual in a class at one lesson must not be made the excuse for neglecting them altogether. It is easy to emphasise unduly the practice of encouraging a pupil to set himself problems. He may well be left to provide himself with mechanical exercises in the four rules which admit of being checked by reverse operations. But the time given to supervising his

Dealing with Errors.

essays in problem-making can ill be spared, though the sacrifice might be made if there were no readier means of testing his grasp of principles. On the whole, it seems better for him to wrestle with questions suggested by maturer experience than to stereotype the impressions he has gained from a limited field.

Oral Arithmetic.

The use of the term oral arithmetic to express a useful school exercise is supplanting the time-honoured but less happily chosen name, mental arithmetic. Perhaps the older term was never held to imply any real antithesis between it and written arithmetic, but we are well rid of a disquieting suggestion that the latter is characterised by mechanical rather than intelligent processes.

Oral arithmetic reconnoitres new ground, skirmishes rapidly over it, approaches it from different points of view, 'locates' traps for the unwary, and when familiar with the configuration retires to headquarters with material for written report. Its functions are to illustrate and fix in the mind principles new to the class, to note the operations required to solve a problem, and to perform those operations with numbers easily grasped; also to recapitulate in a few minutes the acquisitions gained in as many lessons; lastly—and this is a function by no means to be despised—so to exercise the mind that it works accurately and flexibly, ever ready to observe and take the shortest cut to attain its object. According to this view, a place will still be found for some old-fashioned rules. Pupils who recognise that $25=\frac{100}{4}$, that $99=100-1$, will readily make short cuts to results when multiplying by 25 and 99. Better still, they will be led to invent rules for themselves. In connexion with oral work it may be mentioned that a method for decimalising English money at sight will be found in the section on Decimals. The questions

proposed in oral work should be prepared beforehand, in order to avoid undue emphasis on a single type, as well as to secure that suitable numbers are dealt with. It will be found, as a rule, that neglect of oral work is accompanied by unreadiness to frame suitable questions on the spur of the moment. To secure the co-operation of each member of a class, pupils should be required to write answers to questions without recording the methods by which the answers have been obtained. They must, however, be able to give an oral explanation if challenged. The time devoted to oral work will vary with the stage reached. The greater part of the lesson will be oral with very young children.

Decimal Fractions.

At whatever age the formal study of decimals is begun, there can be little reason for the customary delay in applying the decimal system of notation to express tenths, hundredths, and thousandths. From the time the pupil realises the significance of the digits in a two-figure number he ought to be conscious of acting on the principle that a digit moved one place to the left represents ten times its previous value. It seems a simple matter to direct attention to the decreasing value of the digit when moved in an opposite direction. Tenths should be introduced very early in the course; the familiar illustrations, inches and tenths, pounds and florins, are ready to hand. Enthusiastic advocates of decimal systems of measures and money rejoiced in 1849 at the coinage of the tenth of a pound. After nearly sixty years we are left to wonder when and under what name the hundredth part of that unit will appear. Exercises in money sums with pounds and shillings worked first in pounds and shillings, then in pounds and tenths, will display the advantage of the latter—*e.g.* add £7 2*s.*, £8 16*s.*, 10*s.*

a £	*a* s.	*b* £
7	2	7·1
8	16	8·8
	10	·5
16	8	16·4

Decimal notation at once expresses reduction of florins to pounds.

Pointing results in the multiplication and division of decimals is a conclusive test of intelligent working. Whether partial products are assigned to their proper places as the work proceeds, or whether their value is settled by pointing the result, matters little so long as the pupil knows the reason for his method. For instance, suppose the exercise 0·065 × 0·057.

a	*b*
0·065	65
0·057	57
0·00325	455
0·000455	325
0·003705	3705
	·003705

In *a* the first partial product (·05 × ·005) is assigned to the fifth decimal place because thousandths multiplied by hundredths give hundredths of thousandths. When accuracy is required to a given place this plan determines from the first the limits of necessary work. On the other hand, there is much to be said for the more usual method shown in *b*, where for the original exercise there is practically substituted 65 × 57. The result is pointed on the principle that

$$\frac{65}{1000} \times \frac{57}{1000} = \frac{3705}{1000000}$$

Division.

Nothing can be simpler or leave less room for error than the practice of reducing divisor and dividend by such a power of ten that the former (not necessarily the latter) is a whole number. But the method should be in the earlier stages set forth clearly, and special care must be taken that the reducing multiplier is recognised as unity in a convenient form—*e.g.* $0{\cdot}003716 \div 0{\cdot}057$.

$$\frac{0{\cdot}003716}{0{\cdot}057} \times \frac{1000}{1000} = \frac{3{\cdot}716}{57{\cdot}}$$

$$\begin{array}{r|l} & 0{\cdot}065 \text{ Quotient} \\ 57 & 3{\cdot}716 \\ & 3{\cdot}42 \\ \hline & 296 \\ & 285 \\ \hline & 11 \end{array}$$

The first partial quotient is obtained by dividing 371 hundredths by 57. As hundredths are being divided, the quotient must be hundredths. At the first, therefore, the pointing is clear, and if the quotient is arranged as here suggested there is little room for error.

It is necessary to warn pupils that by this method the original exercise has not been worked, but that it has been expressed, as it were, in quantities a thousand times greater than those given. This magnification affects the remainders, though not the quotient—*e.g.* What is the remainder in the above exercise after the second step has been taken? The impulsive pupil says '11,' the more thoughtful, noting that the digits are in the hundredths and thousandths places, replies '11 thousandths.' The teacher will point out that this cannot be correct, for, both dividend and divisor being multiplied by 1000 before division began, it follows that quantities belonging to the magnified

dividend must be reduced to their proper proportion by dividing them by 1000, and that the correct answer is neither 11 nor ·011, but ·000011.

For practical purposes, accuracy to the thousandth part of a unit is as minute as will ever be required. In schools where the calculation of decimals is carried no further, the need for the study of recurrent periods will scarcely arise. All that is necessary is that the pupil shall be able to give a lengthy decimal correct to a required number of places. The 'halfway' numbers, 15, 25, 35, &c., will help him here. ·46 correct to one decimal place is ·5; because of the two quantities 40 hundredths and 50 hundredths, ·46 more nearly approaches the latter. When we read the decimal forms 0·25, 0·50, 0·75 as 25 hundredths, 50 hundredths, 75 hundredths, their equivalence to $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ of the unit is at once recognised. It is worth while to familiarise the pupil with these forms by practical applications of decimals to rules already learnt. For instance, when dividing a sum of money, if the division of pence is carried to the third place of decimals, the quotient can be read as correct to the second place; the digits in these two places being compared with the three forms just given, their value to the nearest farthing is easily expressed. Such a method is especially useful when performing short division by successive factors.

Exercises in decimalising money and in evaluating decimals of a pound at sight recommend themselves by their utility. A florin = £0·1; a shilling is half this, or £0·05; a farthing is $\frac{1}{960}$ of a £, which differs from £$\frac{1}{1000}$ (£0·001) by an error in defect of £0·00004. This error, $\frac{1}{25}$ of a farthing, may be corrected as soon as it reaches $\frac{13}{25}$ of a farthing, *i.e.* as soon as thirteen farthings are considered. The correction for error may be stated thus. For amounts from 3*d.* to 9*d.* inclusive add

Decimalising Money.

£·001 to the result already obtained; for amounts over 9*d.* add a shilling to the amount to be decimalised and subtract as many thousandths as there are farthings in excess of that shilling over the pence dealt with.

Ex. i.—17*s.* $2\frac{1}{4}$*d.*

$$\begin{array}{llll} s. & d. & & £ \\ 17 & & = & 0·85 \\ & 2\frac{1}{4} & = & 0·009 \\ \hline 17 & 2\frac{1}{4} & = & 0·859 \end{array}$$

Ex. ii.—1*s.* $7\frac{1}{2}$*d.*

$$\begin{array}{llll} s. & d. & & £ \\ 1 & & = & 0·05 \\ & 7\frac{1}{2} & = & 0·031 \\ \hline 1 & 7\frac{1}{2} & = & 0·081 \end{array}$$

Ex. iii.—17*s.* $9\frac{1}{4}$*d.*

$$\begin{array}{lllll} & s. & d. & & £ \\ & 18 & & = & 0·9 \\ \text{subtr.} & & 2\frac{3}{4} & = & 0·011 \\ \hline & 17 & 9\frac{1}{4} & = & 0·889 \end{array}$$

Again, £0·100=2*s.*, £0·050=1*s.*, and £0·001=$\frac{1}{4}$*d.* with error in excess equal to $\frac{1}{25}$ of a farthing (*i.e.* when ·013). When the error reaches $\frac{13}{25}f.$—*i.e.* when ·013 is dealt with—one farthing can be subtracted from the result; hence the rule. (*a*) Take the tenths as florins; (*b*) read the hundredths and thousandths together as so many thousandths; fifty of these, if there are so many, yield 1*s.*; (*c*) take the remainder as farthings. If the remainder yields over 3*d.* but not more than $9\frac{1}{4}$*d.*, subtract one farthing; if the remainder yields more than $9\frac{1}{4}$*d.*, subtract two farthings.

£0·731

$$\begin{array}{llll} £ & & s. & d. \\ 0·7 & = & 14 & \\ 0·031 & = & & 7\frac{1}{2} \\ \hline 0·731 & = & 14 & 7\frac{1}{2} \end{array}$$

£0·495

$$\begin{array}{lllll} & £ & & s. & d. \\ & 0·500 & = & 10 & \\ \text{subtr.} & ·005 & = & & 1\frac{1}{4} \\ \hline & ·495 & = & 9 & 10\frac{3}{4} \end{array}$$

Pupils may be set to discover why the 'critical' amounts are 3*d.* and 9*d.* in decimalising, and 3*d.* and $9\frac{1}{4}$*d.* in

evaluating. They will find that £0·037 and £0·038 = 9*d*. ± 0·48*f*., and therefore both must be represented by 9*d*., *i.e.* 9*d*. ± £·0005.

The following diagram will be found useful in the earlier stages :—

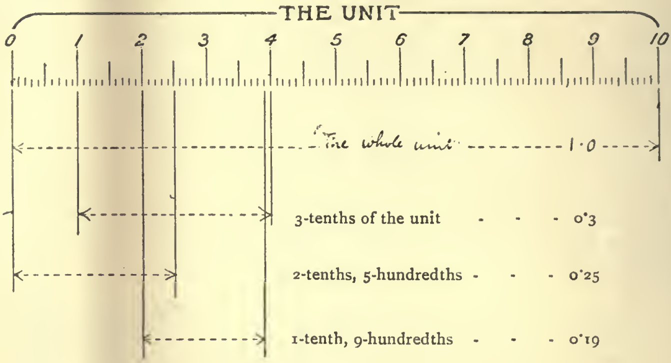


FIG. 2.

A metre scale will be found invaluable in visualising tenths, hundredths, and thousandths. If each pupil be provided with a foot-rule graduated to millimetres he can be practised in drawing lines of given length, *e.g.* 0·111m., 0·056m., &c. He may be required to give the values of dimensions indicated on an enlarged copy of a part of the scale placed on the blackboard—*e.g.*

Visualising Decimal Fractions.

Give in terms of the metre the lengths :

From A or B to C, to D, &c. (Fig. 3).

It is neither necessary nor desirable to proceed with decimals as far as indicated in the preceding paragraphs before dealing with common fractions. As already pointed out, the multiplication table will have familiar-

ised the pupil with certain forms of the latter long before tenths and hundredths are studied. His first attempts in adding or subtracting common fractions will probably be made in connexion with farthings and halfpence. He will have learnt the significance of 'numerator' and 'denominator,' although the terms may not yet have been taught, also the need for bringing such fractions as $\frac{1}{4}$, $\frac{1}{2}$ to the same name before combination. He may also have noted that the same fraction may appear in different forms—$\frac{1}{2}$, $\frac{2}{4}$, $\frac{4}{8}$. He is quite ready for more formal instruction in common denominators, cancellation, proper and improper fractions. Sevenths and elevenths may well be omitted in the early exercises, which will chiefly consist of comparison and analysis of easy fractions, *e.g.* the teacher proposes $\frac{5}{6}$. Pupils analyse thus:

Common Fractions.

$\frac{5}{6}=\frac{4}{6}+\frac{1}{6}$; that is $\frac{2}{3}+\frac{1}{6}$

or $\frac{5}{6}=\frac{3}{6}+\frac{2}{6}$; that is $\frac{1}{2}+\frac{1}{3}$

Again, taking eighths for fractions, the whole number 3 may be analysed thus: $3=2\frac{1}{8}+\frac{7}{8}$, or $1\frac{5}{8}+1\frac{3}{8}$, and so on. Such practice is rarely given in English schools. An Englishman recently visiting a German primary school was surprised at the readiness with which each pupil in a class took his part in oral work of this kind.

FIG. 3.

Measures and multiples are conveniently studied together. Readiness in factorising is so essential to both, that practice in breaking up composite numbers and recognising prime numbers should receive more than the customary attention. Although text-books in algebra abound in exercises intended to promote skill in the art of factorising, one rarely meets with similar exercises in text-books on arithmetic. Let the pupils be required to give the prime numbers between 80 and 90, or the prime factors of such numbers as 91, 96, 105, 1001, and their weakness will become apparent. As a combined exercise in measures and multiples, let us take the numbers 18 and 24:

Factors.

$$18=2\times 9 \qquad\qquad 24=2\times 12$$
$$\;\;=2\times 3\times 3 \qquad\qquad \;\;=2\times 2\times 6$$
$$\qquad\qquad\qquad\qquad \;\;=2\times 2\times 2\times 3$$

Common measures are seen to be 2, 3 and their product 6, the last being the highest common measure or factor. The least common multiple must be not less than $2\times 2\times 2\times 3\times 3=72$.

At this stage tests for divisibility of numbers should be known; the principles underlying the tests may be studied later. It will be noticed that the removal by division of one factor often discloses others not suspected.

Care should be taken to connect the new work with that already done. It is frequently found that pupils fairly conversant with addition and subtraction of vulgar fractions not only fail to recognise that they are engaged in similar operations when adding and subtracting pence and farthings, but that they are unable to work correctly exercises with concrete quantities involving fractions. Examples of this type should be given: 1 ft. $1\frac{1}{10}$ in. $-$ $10\frac{1}{8}$ in.; 3*s.* $10\frac{5}{6}$*d.* $+$ $11\frac{3}{4}$*d.* $+$ 1*s.* $0\frac{1}{12}$*d.*

Probably no exercise in fractions gives the teacher so much trouble as the ingeniously constructed complex fraction. The most cursory glance at a set of class papers reveals the measure of the teacher's skill and persistence in securing proper sequence, the absence of 'scrappy' working, and a recognition of the proper functions of signs and brackets. Preliminary exercises of the following type should be worked, first with the bracket and then without.

Signs and Brackets.

	With brackets	Without brackets
(*a*)	$(3+4)\times(5-1)$	$3+4\times5-1$
(*b*)	$(\frac{1}{2}+\frac{1}{3}-\frac{1}{4})\div(\frac{1}{2}-\frac{1}{3}+\frac{1}{4})$	$\frac{1}{2}+\frac{1}{3}-\frac{1}{4}\div\frac{1}{2}-\frac{1}{3}+\frac{1}{4}$

A frequent source of error is the confusion of compound fractions with exercises in multiplication.

Because $\frac{3}{4}$ of $\frac{1}{2}$ and $\frac{3}{4}\times\frac{1}{2}$ give the same result, pupils regard them as identical operations and unhesitatingly replace the link 'of' by the multiplication sign. Diagrams will show that not only do we operate on $\frac{1}{2}$ in the former case and on $\frac{3}{4}$ in the latter, but that the operations themselves differ. The class should be tested by such examples as $\frac{3}{4}\div\frac{5}{6}$ of $\frac{4}{7}$ and $\frac{3}{4}\div\frac{5}{6}\times\frac{4}{7}$.

Before leaving the subject of fractions a few remarks may be offered concerning recurring decimals. A full course would include a study of the cyclic and complementary laws, and these are best investigated after Fermat's theorem has been mastered. Few pupils reach this stage of theory work, most teachers being content with such practice in transforming common fractions to decimals, and decimals to common fractions, as will illustrate the more easily explained results. Conversion of repeating decimals to equivalent common fractions introduces the pupil to ideas of 'limit' and

Recurring Decimals.

'infinity.' The subject will at first be presented in some such way as this : Consider ·9999, &c.

·9	differs from unity by	$\frac{1}{10}$
·99	" " " "	$\frac{1}{100}$
·999	" " " "	$\frac{1}{1000}$

The successive differences will be visualised by reference to a known unit, preferably a metre, where $\frac{1}{10}$, $\frac{1}{100}$, $\frac{1}{1000}$ may be identified on the scale. The differences rapidly become so minute as to be less than the smallest quantity we choose to name. When, therefore, a sufficient number of nines is taken, we are justified in taking $\cdot\dot{9}$ as equivalent to unity, which is the *limit* towards which $\cdot\dot{9}$ approaches.

A common proof of the rule for conversion raises a difficulty which ought not to be passed over. Take, for example, $\cdot\dot{5}$. The process is often stated as follows :

Let $x = \cdot 5555$ &c. I
then $10x = 5\cdot 5555$ &c. II
Subtracting I from II $9x = 5$ III
whence $x = \frac{5}{9}$

Inquiring pupils will very probably want to know why the last 5 is introduced in II. It is better to proceed thus :

Let $x = \cdot 5555$ I
then $10x = 5\cdot 555$ II
Subtracting I from II $9x = 5 - \cdot 0005$ III

The right-hand side of III differs from 5 by ·0005, and with every extension of the fives in I this difference rapidly decreases; with a sufficient number of fives it becomes less than any quantity we choose to name. Hence we are justified in taking the right-hand side of III as 5, and therefore $x = \frac{5}{9}$. It is worth while to notice

that when asked for the unexpressed denominator of a decimal fraction, pupils often reply that in the case of a pure decimal it is some power of 10, but that the unexpressed denominator of a pure repeating decimal is *a certain number of nines!*

Exercises in the rule of three are usually worked by the 'unitary method.' Question and condition must be clearly distinguished in each, and it is well to make a rough estimate of the answer. The form in which the condition is stated will sometimes be modified to adapt it to the final statement which usually ends with the answer. If this puzzles the pupils they should be practised in stating the condition in two ways—*e.g.* 4 hats cost 18*s.*, 18*s.* is paid for 4 hats. A greater difficulty remains, for, whether proportion is taught or not, the difference between direct and inverse variation must be taught. The former requires little illustration. Every child knows that a quantity of goods and its gross value are so related that the doubling or halving of one involves the doubling or halving of the other, supposing the rate remains constant. Ideas of inverse variation will be found less familiar.

'Rule of Three.'

The formation of a constant product by different pairs of factors furnishes a useful illustration—*e.g.* let the product be 60.

	$(a) \times (b)$	
$60 =$	6×10	
$=$	12×5	6 is doubled, 10 is halved.
$=$	3×20	12 is divided by 4, 5 is multiplied by 4.
$=$	15×4	3 is multiplied by 5, 20 is divided by 5.

The factors are seen to vary *inversely*.

Questions similar to the following should be readily answered:

How do the following quantities vary?

First	Second	Supposed Constant
Number of articles	Price of each	Gross value
Distance travelled	Time of travel	Rate of travel
Distance walked	Length of step	Time of walking
Time of walking	Length of step	Distance walked
Length of rectangle	Breadth of same	Area

The working-out of exercises in the rule of three may be greatly simplified if the pupil is encouraged to 'cancel' and to remember the golden rule:

Multiply only when you must:
Divide whenever you can.

He should be practised in such preparatory exercises as these:

$$\frac{26\times 49}{91};\quad \frac{20}{14}\times 56;\quad 550 \text{ times } \frac{260}{1001}.$$

Proportion.

Proportion has fallen out of favour since teachers began to recognise that rule of three by proportion meant proportion by rule of thumb.

It seems a pity to neglect a subject which may be so easily illustrated from geometry. Let the pupil make any triangle, the larger the better, and draw a line parallel to the base cutting the other two sides into four segments. Let him measure these segments in inches and tenths and he will have the material for a full proportion and that without dreaming of Euclid vi. 2.

He will learn what is really meant by ratio and proportion. He will discover that the product of the means is equal to the product of the extremes. He will learn to attribute discrepancies to inaccurate measurement. He may even set out three terms of a proportion by appropriate distances on two lines drawn from a point, and find the fourth by means of parallel lines.

At all events he will work proportion with the clear conception of one who has learnt from the concrete.

Percentages.

Unsatisfactory results in this easy subject may usually be traced to want of clearness in the teaching or to lack of preparatory exercises. Important 'rates' or 'per cents.' should be associated with fractions thus :

20% is $\frac{1}{5}$	$50\ \%$ is $\frac{1}{2}$	$33\frac{1}{3}\%$ is $\frac{1}{3}$
10% ,, $\frac{1}{10}$	$25\ \%$,, $\frac{1}{4}$	$16\frac{2}{3}\%$,, $\frac{1}{6}$
5% ,, $\frac{1}{20}$	$12\frac{1}{2}\%$,, $\frac{1}{8}$	$8\frac{1}{3}\%$,, $\frac{1}{12}$
$2\frac{1}{2}\%$,, $\frac{1}{40}$	$75\ \%$,, $\frac{3}{4}$	$66\frac{2}{3}\%$,, $\frac{2}{3}$

Oral exercises with easy numbers dealing with familiar subjects should next be given, *e.g.* you write correctly 75% of the items in a spelling test of 12 words. How many is that ? 20% of a class of 40 are absent. How many are present ? If 20% of a number is 5, what is the number ? What percentage is 7 of 70 ? And so on.

Distinguish clearly the 'base' on which the rate is levied and the percentage of that base which the rate yields. The pupils must be led to see that

$$\text{Percentage} = \text{base} \times \text{rate and therefore}$$
$$\frac{\text{Percentage}}{\text{base}} = \text{rate, and } \frac{\text{percentage}}{\text{rate}} = \text{base.}$$

Decimals will be largely used.

Give 1% of 300, of 450, of 125, &c.

Hence 2%, 3%, 4%, &c., of these same numbers.

At this stage most teachers apply the principles already studied to commercial arithmetic. Such a course necessitates the acquisition of much general information concerning business terms and business practice. In fact, the practical nature of the work forms its only justification. There is no excuse for burdening the pupil with rules he will rarely or never practise out of school. A well-informed pupil should

be able to calculate a simple interest, commission, or discount. He may be expected to know that the Post Office rate of interest is $\frac{1}{2}d.$ per £ per month and to find the yield of 'stocks' from 'quotations' in the daily papers. In all such operations he will recognise the application of principles already familiar.

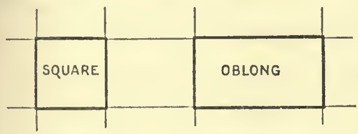
Mensuration.

Perhaps no part of the arithmetic course is so useful and interesting, or gives such opportunities for practical work, as the measurement of space. Linear surface and volume units have already been remarked upon. It remains to note a few of the difficulties met with by beginners in mensuration.

The nomenclature of four-sided plane figures is best learnt by considering the closed figures formed by intersecting pairs of parallel straight lines.

If the pairs cross at right angles the figure formed will be a *rectangle.* If, further, the distances between the lines of each pair of parallels are equal, the rectangle will be a square ; if not, an oblong.

Area.

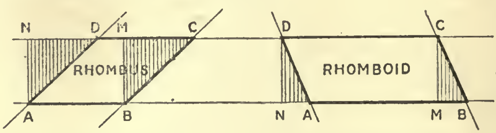


All sides equal.
All angles 'right.'

Opposite sides equal.
All angles 'right.'

FIG. 4.

If the pairs of parallels cross at any other angle a rhombus or rhomboid is formed.



All sides equal.
Opposite angles equal.

Opposite sides equal.
Opposite angles equal.

FIG. 5.

By cutting off the parts C M B and placing them on D N A it will at once be seen that the areas of the rhombus and rhomboid are equivalent to the areas of oblongs on the same base and of the same perpendicular height. The pairs of parallels may conveniently be formed by strings stretched on a blackboard. If the parallelism of one pair is destroyed we get a trapezoid; if the parallelism of both pairs is destroyed we get a trapezium.

The area of a triangle drawn on squared paper will be calculated from the area of the inclosing rectangle, of which it is seen to be the half.

In dealing with the circle the relation of circum-

Fig. 6

Fig. 7.

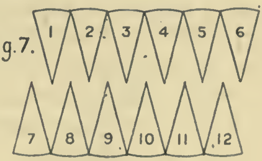
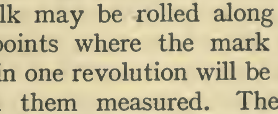


Fig. 8.



ference to diameter will first be determined. A hoop marked with chalk may be rolled along in a straight line. The two points where the mark on the hoop touches the floor in one revolution will be noted and the distance between them measured. The diameter of the hoop will be contained in this distance three times and 'a bit.' The 'bit' will be contained in the diameter nearly seven times. The circumference is therefore nearly $\frac{22}{7}$ times the diameter, or the ratio between diameter and circumference may be taken at $\frac{7}{22}$. To find the area of a circle, divide the circumference into any even number of equal parts, the more the better.

Join opposite parts by diameters as in fig. 6. Cut up the circle and arrange as in fig. 7. When the toothed figures meet, fig. 8 will be formed. With very many teeth fig. 8 will be more nearly an oblong, the area of which is found by multiplying length and breadth.

$$\therefore \text{ Area of circle} = \frac{\text{circumference}}{2} \times \frac{\text{diameter}}{2}$$

$$(i.e.\ \pi r \times r \text{ or } \pi r^2).$$

The incommensurability of diameter and circumference may here be pointed out, and perhaps also some ancient approximations towards their ratio. Pupils will be interested in the Egyptian method of finding the area of a circle. More than three thousand years ago they used to subtract one-ninth from the diameter and square the remainder for the area—a useful approximation. Such occasional reference to the history of arithmetic forms a welcome interlude in serious practice.

The curved surface of a cylinder is readily found by developing it into an oblong whose dimensions are the height of the cylinder and circumference of its base. The curved surface of a sphere does not admit of development and the formal proof of the theorem establishing the formula $4\pi r^2$ will probably be too difficult for the pupils. The following is a simple illustration. Get a hemisphere and a cylinder, with equal circular bases, the height of the cylinder being equal to the diameter of its base. It will be found that the same length of cord which exactly covers the curved surface of the hemisphere on being coiled round it will also cover half the curved surface of the cylinder, and therefore if a sphere and cylinder of equal height have equal radii, their curved surfaces will also be equal.

After a volume has been determined, pupils are always interested in testing the result by measuring the liquid displaced by its immersion. A hollow cube

should be at hand into which the contents of an irregular vessel may be poured; the volume of the latter can then be found from measurements made on the former. Prisms and pyramids of the same height and with bases of the same area and shape should be made in cardboard. Three times the contents of the pyramid will just fill the prism. (Silver sand is a useful material.) A hollow cylinder and cone, together with a sphere, all of the same height and radii, form a useful apparatus. Place the sphere in the cylinder, fill up with silver sand, remove the sphere, and the sand used will just fill the hollow cone, and three times the contents of the cone will just fill the cylinder. The experiment will show roughly that the volumes of such a cone, sphere, and cylinder are proportional to the numbers 1, 2, and 3.

Volume.

There will be no lack of interest when the lessons are thus illustrated. In the practical work, done by sections of the class after the teacher's demonstration, it is desirable that the pupils should work in pairs.

When π is used for the ratio $\frac{\text{circumference}}{\text{diameter}}$, the following table is useful:

$$\left.\begin{array}{rl} \text{Circumference of circle} = & D \times 3{\cdot}1416 \\ \triangle \quad ,, \quad = & D^2 \times \cdot 7854 \\ \text{Vol. sphere} = & D^3 \times \cdot 5236 \end{array}\right\} \text{ i.e. } \left\{\begin{array}{l} D \times \pi \text{ or } 2\pi r \\ D^2 \times \frac{\pi}{4} \;,,\; \pi r^2 \\ D^3 \times \frac{\pi}{6} \;,,\; \frac{4}{3}\pi r^3 \end{array}\right.$$

Multiplication by ·7854 may be rapidly performed by taking as multipliers for the partial products:

$$\begin{array}{r} \cdot 7 \\ \cdot 07 \\ \cdot 014 \\ \cdot 0014 \\ \hline \cdot 7854 \end{array}$$

Some exercises in mensuration, especially those met with in studying the applications of Euclid i. 47, necessitate the extraction of the square root. It is well not to isolate this subject, for just as addition and subtraction, multiplication and division are taught in pairs, so will involution and evolution be studied together, an exercise in involution being followed by one in evolution. Both may be illustrated by geometrical figures. Take for example the square of 36 (30 + 6).

Involution and Evolution.

$$
\begin{array}{rl}
30 + 6 & \\
30 + 6 & \\
\hline
36 & = \text{square of the units} \\
\left.\begin{array}{r}180\\180\end{array}\right\} & = \left\{\begin{array}{l}360\text{, the doubled product of tens and}\\ \quad\text{units}\end{array}\right. \\
900 & = \text{square of the tens} \\
\hline
1296 & = \text{square of } 36
\end{array}
$$

The two squares and the doubled product will be illustrated geometrically, preferably on squared paper.

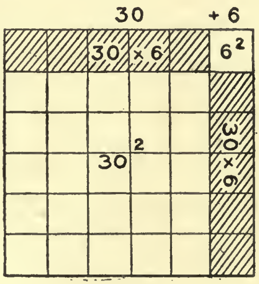


Fig. 9.

A sufficient number of exercises should be given to show that if a whole number is broken up into two parts, the square of the whole is equal to the square

of one part added to the square of the other part and this sum increased by twice the product of the two parts. If the pupil has begun algebra or has been trained to reason on quantities represented by letters he will easily remember these facts under the form

$$(a+b)^2 = a^2 + b^2 + 2ab.$$

If he is studying Euclid he will recognise Euclid ii. 4.

Now let it be required to find the square root of 1296. Tens and hundreds in a root will give hundreds and ten thousands respectively on being squared. There are no ten thousands in 1296, therefore there will be no hundreds in the root. 3 tens and 4 tens when squared give 9 hundred and 16 hundred respectively. Hence it is known that the required root lies between 30 and 40.

Arrange as in the example, and subtract the square of 30 from 1296. The remainder is 396.

$$\begin{array}{rrl}
 & 1296 & (30+6) \\
 & 900 & \\
 \cline{2-2}
2 \times \text{tens} = 60 & & \\
\text{units} = \ \ 6 & 396 = & \left\{\begin{array}{l}\text{doubled product of tens and} \\ \quad \text{units} + \text{square of units} + \text{re-} \\ \quad \text{mainder if any}\end{array}\right. \\
\cline{1-1}
66 & 396 = & \left\{\begin{array}{l}(2 \times \text{tens} + \text{units}) \times \text{units}\ ; \quad \text{or,} \\ \quad 2 \times \text{tens} \times \text{units} + \text{units}^2\end{array}\right.
\end{array}$$

This remainder is made up of at least two parts—the doubled product of tens and units, and the square of the units' figure.

The doubled product is made up of *three* factors: 2, tens, units. Of these only the first two are known, but their product used as a trial divisor into 396 will disclose the units' figure, which can then be used in the computation.

In a similar manner the cube of 36 may be formed so as to show that it contains four quantities:

The cube of the tens;
$3 \times \text{tens} \times \text{units}^2$;
$3 \times \text{tens}^2 \times \text{units}$;
The cube of the units.

It is true that involution and evolution are more readily performed by the aid of logarithms, but the foregoing method shows that the ordinary rules for the extraction of square and cube roots can easily be made intelligible by the earlier rules of arithmetic.[1]

Algebra.

It is unfortunate that the algebra of number is commonly regarded in schools as a subject widely differing from arithmetic. In deference to this view, the study of the subject is usually postponed until the pupil has acquired a general knowledge of the principles of arithmetic, and it is then approached with the hesitation natural to one who takes *omne ignotum pro magnifico*. The symbols of algebra stand for numerical quantities, its signs and operations are for the most part identical with those of arithmetic.[2] The difficulties of beginners are exaggerated; they would be much less formidable if they were introduced early and faced one at a time.

Early Difficulties.

Take, for example, the initial difficulty—the conception of a literal symbol for a number at present unknown. A child of ordinary intelligence can take part in such a conversation as this: 'I am thinking of a number. What is it?' (Silence after the offers of specific numbers have been rejected.) 'I want a name for it;

[1] Horner's method of extracting roots is to be recommended both on account of its simplicity, and also because it is applied generally to the extraction of any root. At a later stage pupils will use logarithmic tables for evolution.

[2] The extension given to the significance of the signs + and − in algebra is noted below.

what shall we call it ?' 'Let us call it x.' 'I want to add seven to it. How shall we write the sum ?' ($x+7$.) 'The whole is 20. Now for the secret number ?' Children write :

$$x+7=20$$
$$13+7=20$$

The number thought of was 13.

But it may be urged that algebra extends the idea of number so as to include negative quantities. Is the idea altogether new ? A rash player with only ten counters in his pocket has just lost a dozen in a game. He appreciates his insolvency accurately enough, and will readily express it as a want of solvency when he is taught the conventional notation for it. Or if a concrete illustration is sought for in space relations, he is quite capable of translating 'positive' and 'negative' into directional opposites. Far more real to the beginner are the difficulties met with in recording the results of operations in algebra. The sum and product of 2 and 3 differ from both digits in form as well as in value. When the results of similar operations on a and b are recorded the forms $a+b$, ab, appear to the beginner a very incomplete record ; he would be less surprised if the sum and product were expressed by some other letters of the alphabet. Numerous similar instances will be noted when his inevitable errors are traced to their source.

The algebra course furnishes an admirable recapitulation of the principles of arithmetic, some of which appear to be more readily comprehended in their general form. If 4×5 and xy are written down, and a class is required to multiply the first product by 2 and the second by a, it will be found that some pupils who unhesitatingly write axy in the latter case will double *both* factors in the former. The distributive law of

multiplication is more easily appreciated in the form $a(b+c)=ab+ac$ than in the form $2\times(4+5)=18$. The reason is obvious; $b+c$ is the final form in which the sum of the quantities 'b' and 'c' is written. $4+5$ is almost unconsciously replaced by 9.

Algebra should begin with simple equations. The child is familiar with such statements as $2+3=5$; $2\times3=6$; $\frac{4}{5}=\frac{16}{20}$. It is an easy step to write these equations in the form $x+3=5$; $2x=6$; $\frac{x}{5}=\frac{16}{20}$.

The two sides of the equations may be regarded as the scale-pans of a balance when the beam is horizontal.

Equations.

A preliminary formal statement of the axioms on which the processes of solution depend will only repel the beginner. His common sense will teach him that whatever quantity is added to or taken from one scale-pan must be added to or taken from the other scale-pan if the balance is to be preserved, and that *both* balanced quantities must be operated on if multiplication or division is necessary. For convenience' sake the experimenter with the balance keeps his weights ready to his right hand. For no more occult reason, the side of the equation containing the unknown term is usually placed on the left. Whatever operations are then necessary for isolating x will be performed on both sides of the equation, after which the solution will be obvious. The beginner will be much more embarrassed by the difficulty of stating an equation than in following the processes of solution. He will need constant practice in symbolical expression, and for this purpose a considerable part of the earlier lessons will take the form of such oral work as this: By how much is x less (or greater) than 7? One part of 12 is 'a'; what is the other part? Express in pence £$x+y$ shillings$+z$ pence. Express in units x hundreds$+y$ tens$+z$ units. What must be added to the

product of a and b to make it equal to the quotient of c divided by d? Name three consecutive numbers with x for the middle number. Name the 1st, 2nd, 3rd, nth odd number, etc.

When reasonable facility in symbolical expression has been acquired, simple arithmetical 'puzzles' may be explained. Every schoolboy is familiar with them. A common form runs thus:

1. Think of a number.	x
2. Double it.	$2x$
3. Add (say) 10.	$2x+10$
4. Halve.	$x+5$
5. Take away the number first thought of	5

Remainder 5—*i.e.* half the number added in 3.

The 'mystery' will be explained by writing in a parallel column the symbolic expression of the processes. Beyond the interest stimulated by these exercises they are often of real value in illustrating arithmetical principles; they are always acceptable to pupils, who regard them as mathematical recreation, and are not slow to invent puzzles of their own. They may be increased at pleasure, the standard of difficulty being raised as the ability of the class develops. Here are a few examples increasing in difficulty:

Write a number of three digits, the hundreds' digit exceeding the units' by, say, two. Reverse the order of the digits and subtract. Why is the remainder a multiple of 99? Invent a similar exercise where the remainder is the fifth multiple of 99.

Write a sum of money in £ *s.* *d.* less than £12. Reverse, writing pounds as pence and pence as pounds. Subtract. Reverse the remainder. Add. Why is the sum always £12 18*s.* 11*d.*? What is the reason for the condition 'less than £12'?

	A	B
Ask A to take any number of counters (say 'a')	a	—
Ask B to take p times as many as A has	—	pa
Ask A to give n counters to B	$a-n$	$pa+n$
Ask B to give A p times as many counters as A then has	$(a-n)+p(a-n)$	$pa+n-p(a-n)$ $=n(1+p)$

B will have $n(1+p)$ counters left.

(The last is taken from a fascinating book by W. W. Rouse Ball on 'Mathematical Recreations and Problems.')

At a somewhat later stage rules of arithmetic may be generalised—*e.g.* $\frac{N}{D} = Q + \frac{R}{D}$ to summarise operations in division; simple interest on a given principal $= \frac{P \times R \times T}{100}$; area of triangle $= \frac{bh}{2}$; and the like.

Brackets.

The use of brackets in arithmetic has already been referred to. In dealing with the more complicated forms which algebra presents, the pupil will take care to remove inner pairs first after distributing the bracket factor, if any, over all the quantities contained in the bracket. He may also be very profitably employed in inserting brackets according to directions.

Signs.

The teacher must decide for himself whether he will allow the signs + and − to be used empirically, or whether he will attempt a clear explanation of their efficacy. In either case attention must be drawn to the extension given to their significance in algebra. In arithmetic they have been used only as *operation* signs meaning add (or subtract) the quantity following. No *qualitative* signi-

ficance exists, for negative quantity has not been recognised in arithmetic. In algebra they acquire a qualitative meaning—the quantities following them are to be taken in a positive or negative sense—that is to say, in opposite senses. Whatever significance is given to the term 'positive,' an exactly opposite significance must be given to the term 'negative.' How is this significance to be illustrated ? Of the many illustrations that may be given there is no doubt that the directional illustration is the most convenient, not only for its simplicity, but also for its application in subsequent mathematical studies. There is also the further advantage that it makes clear a certain operative significance of the signs in algebra—namely, the preservation or reversal of an original direction. The following table will summarise the various uses of the signs in algebra and arithmetic, assuming a directional interpretation in algebra.

Interpretation		of +	of −
In Arithmetic	Qualitative	None (negative quantities not recognised in Arithmetic)	
	Operative	Add	Subtract the following quantity
In Algebra	Qualitative	Positive	Negative
	Operative	Preserve	Reverse the original direction

The pupil's attention will be directed to the conventions regarding positive and negative as direction towards the right and left respectively, and the usual omission of the positive sign before an initial quantity. When the signs + and − come together before a quantity, deal first with the sign nearest the quantity, regarding it as qualitative, then 'operate' with the other sign.

The expressions $a \pm b$ and $a \pm (-b)$ can be illustrated as follows :

I. $a+b$. Measure 'a' units in the positive direction, and from the end farthest from the origin measure 'b' units in the same direction. *Result*, $a+b$ units in the positive direction from the origin.

II. $a-b$. Measure 'a' units as in I., then from the end farthest from the origin measure 'b' units in the negative direction—*i.e.* backwards. *Result*, $a-b$ units from the origin. Whether the final point reached is to the right or left of the origin depends on the relative magnitude of a and b.

III. $a+(-b)$. Measure 'a' as before. Measure 'b' as in II., taking $-$ as a qualitative sign. Then consider $+$ as operating to *preserve* the negative measurement. *Result* as in II.

IV. $a-(-b)$. Measure 'a' and 'b' as in II. and III. Then consider the first negative sign as *operating* to reverse the negative measurement $-b$. *Result* as in I.

Results arising from $(\pm a) \times (\pm b)$ will be similarly illustrated, the sign of the multiplicand being interpreted qualitatively, that of the multiplier operatively, thus:

V. $(\pm a) \times b$. Measure 'a' units in the direction indicated by the sign preceding 'a,' take 'b' times this length in the same direction. Result, 'ab' units in the direction indicated by the sign of 'a.'

VI. $(\pm a) \times (-b)$. Proceed as in V. Then the negative sign before 'b' operates to reverse the direction of the 'ab' units.

When divisor and quotient are multiplied, their signs determine that of the dividend; the rule for signs in division will therefore be deduced from those for multiplication.

It may be objected that the suggested method of

dealing with signs illustrates vector arithmetic rather than the algebra of numbers. The objection may be complacently admitted. Just as the conception of pure number has been abstracted from the contemplation of concrete objects, so here, the pupil learns the efficacy of algebraical signs by 'going to the concrete.' In later lessons he will have nothing to unlearn. On the contrary, he will find that a development of the directional interpretation lies at the root of much of his advanced study in mathematics.

Graphs.

This appeal to the eye is made by resourceful teachers in almost every lesson. Facts win ready recognition when they can be presented in diagrammatic form. The dullest pupil may be made to grasp the truth embodied in a 'graph.' Simple graphs should be given in the arithmetic course, a fuller study being postponed till the significance of the negative sign in algebra is understood.

When once the method of recording results or observations is understood—and a single lesson more than suffices for this—a hundred matters in the pupil's daily experience offer material for examples. The pupil's monthly record of his growth, his prowess at the wicket, thermometer and barometer readings, class attendance, and the like may be recorded by pupils of very tender age. Somewhat later they will plot lengths of pendulum and the observed number of oscillations per minute, expectation of life at various ages, premiums on life assurance varying with age (material for the two last is at hand in 'Whitaker's Almanac'), matters of interest in the daily paper—*e.g.* exports and imports for a given period. The store of material is inexhaustible. One thing must not be lacking—a good supply of squared paper. The pupil will be embarrassed at first in adapting his scale of representation to the size of his paper. He soon learns that the horizontal

and vertical scales need not be identical. After plotting *observed* numbers as in the pendulum experiment, it is frequently found that the curve does not pass smoothly through the points obtained. This fact will draw attention to possible errors of observation. When one quantity is directly proportional to another, the graph obtained by plotting their varying values is a straight line, but when one quantity varies at a different rate from the other a curve is formed. The pupil should discover these facts for himself, but he will need guidance, for it is not enough to construct graphs: interpretation must go hand-in-hand with construction.

Graphs calculated from simple formulæ connecting 'x' and 'y' will reveal the fact that equations of the first degree can be represented by straight lines, while those of the second degree are represented by curves. Graphic solutions of simultaneous equations, visualising the roots of a quadratic equation, are exercises in which pupils take the keenest interest, such a marvel to them is this vivifying of the dry bones of algebra, such a revelation to find that algebra can 'talk geometry.'

If the student takes up trigonometry he will by means of the 'graph' trace the trigonometrical functions of an angle through the four quadrants. In mechanics he can plot the path of a body falling freely but moving at the same time with horizontal velocity. In the laboratory he finds in the graph a faithful record of his observations and suggestions for further experiment. It is hardly too much to say that to-day the graph is a *sine qua non* to the mathematician, physicist, statistician, and engineer.

Factorising.

It is probable that in multiplication and division the pupil will fall back on the mechanical rules 'like signs produce +,' 'unlike signs produce −.' There is great advantage in doing so, but at intervals he should be required to

justify his procedure. He should pass, leisurely if need be, through the 'four rules,' attending to the order of quantities in the arrangement of divisor and dividend, and noting the principles of symmetry and homogeneity.[1] But all this time he should be preparing for the next step forward by practice in factorising. Just as it would be unreasonable to expect progress in arithmetic without mastering the multiplication table, so is it equally hopeless to attempt an advance in algebra until the commonest types of factors automatically suggest their product. No pains must be spared to make this part of the work thorough. Any good text-book will furnish extensive practice. Any illustration, arithmetical or geometrical, should be welcomed if it promises to fix the type in the mind. Set rules are a hindrance rather than a help. Let the pupil multiply the factors given him, and, after an interval, say at the next lesson, reconvert his products into factorial form. The standard forms will, of course, receive special attention: $(a+b)(a+b)=a^2+2ab+b^2$; $(a-b)(a-b)=a^2-2ab+b^2$; $(a+b)(a-b)=a^2-b^2$. It is a good plan to insist on the formula being translated into ordinary language and committed to memory in the latter form—*e.g.* the square of the sum of two numbers is equal to the sum of their squares added to twice their product. Memoriter work has become so discredited in recent years owing to a horror of 'cram' that there is now far more danger of memory becoming atrophied than overburdened. When memory simulates the results of other mental functions this may truly be called cram, but the term is improperly applied to the process of fixing in the memory processes which the 'other mental functions' have helped us to perform.

[1] Multiplication by detached coefficients and synthetic division had better be avoided in a first course.

It will be well to omit the sigma notation in a first course of algebra, and perhaps the more difficult standard forms—*e.g.*

(i.) $3(a+b)(b+c)(c+a)=(a+b+c)^3-(a^3+b^3+c^3)$.
(ii.) $(a+b+c)(a^2+b^2+c^2-ab-bc-ca)=a^3+b^3+c^3-3abc$.

The advantage of the memory work suggested above is obvious in (i.) when the right-hand side is concisely expressed as 'the difference between the cube of the sum and the sum of the cubes.' When (ii.) is studied the effect of varying the sign of a or b or c will be traced throughout the identity.

The continued product of two or more binomials repays careful study. The pupil should be set to find the product of the first two, three, four, or more terms of the expression $(x-a)(x-b)(x-c)$, &c., arranging the resulting coefficients thus:

With four factors

$$
\begin{array}{r|c|c|l}
\multicolumn{4}{c}{(x-a)(x-b)(x-c)(x-d)} \\
=x^4-a & x^3+ab & x^2-abc & x+abcd \\
-b & +ac & -abd & \\
-c & +ad & -acd & \\
-d & +bc & -bcd & \\
 & +bd & & \\
 & +cd & &
\end{array}
$$

Taking a, b, c, d, each equal to unity, the expression gives the expansion of $(x-1)^4$, *i.e.*

$$x^4-4x^3+6x^2-4x+1.$$

The coefficients and signs will have special significance for the student who proceeds to combinations, the binomial theorem, and the theory of equations.

Each progressive step presents opportunities for revising and developing previous lessons. Frequent revision is at least as necessary in algebra as in

arithmetic. Exercises in the multiplication and division of quantities involving fractional indices should run concurrently with the study of indices.

Revision.

Fractions are most readily simplified by skilful factorising and equally skilful distribution of factors over collected terms.

At this stage many students are discouraged by the exceedingly slow development of their power to invent shortened methods of working. The artifices they see used in simplifying complex fractional forms and in solving equations appear bewildering in their variety, and highly artificial in character. Perhaps too much time is spent on fractions. It is certain that equations which require special artifices for their solution should be sparingly proposed. Some text-books revel in algebraical legerdemain; the examples given in them may be used for occasional reference. Important devices, frequently required, will be mastered one at a time. Such are the conversion of an alphabetic to a cyclic order of quantities and the reverse, the completion of an unfinished square quantity, the rationalising of a surd, and the like.

There are some processes simple enough in themselves which depend for their justification on principles enunciated in more advanced work.

Process and Principle.

In the laboratory the student will be expected to work out formulæ which have been established by experienced investigators after long and patient research. No one expects him to justify these formulæ, all that is required of him is accurate work, and an intelligent application of algebraical methods. But in the class-room it will often be a question for the teacher as to how far he will encourage the use of 'rule of thumb' methods. Considerations of utility often appear inconsistent with a conscientious desire for intelligent practice. There is

perhaps greater reason to be apprehensive of a too scrupulous desire to make sure of one's ground. It is not wise to withhold the knowledge of an easy test in factorising because the 'remainder theorem' has not been mastered; to forbid the use of logarithms before the exponential theorem is understood; to discourage Horner's method of extracting the roots of equations because the pupil has not learnt to 'depress' an equation. In all such cases it is best to steer a middle course, indicating the path of investigation to be pursued in justifying artifice or formula, but, above all, securing the mental attitude which wants to know.

Logarithms.

The use of logarithms will be greatly facilitated if pupils make a slide rule and perform by its means the operations of multiplication, division, involution, and evolution with easy numbers. A table of four-figure logarithms is to be found in most text-books; it may be bought for a penny. Much may be learnt from the table itself—*e.g.* $\log 6 = \log (2 \times 3) = \log 2 + \log 3$; $\log 5 = \log \frac{10}{2} = \log 10 - \log 2$; $\log 8 = \log 2^3 = 3 \log 2$; and so on, the results being verified from the table.

Again, $10^{\frac{1}{2}}$ can be found by extracting the square root, 3·132. Then $\frac{1}{2}$, expressed in its decimal form ·5, is the log of 3·132 to the base 10. Suggestive exercises will be found in a pamphlet issued by the Department of Science and Art (Professor Perry's 'Lectures to Working Men on Practical Mathematics,' pp. 9–12). A formal study of logarithms should be preceded by such exercises.

Geometry.

Froebelian methods of teaching have in recent years influenced the study of geometry more than any other subject of the school curriculum. The most deductive of sciences has relaxed the rigidity of its method as a concession to beginners, and has accepted the help of observation and experi-

ment. Practical geometry, indeed, has long been a favourite subject in the primary school curriculum, but the object has been to secure neat and accurate working of set problems rather than to foster reasoned processes. In the secondary school Euclid has dominated geometrical studies, and these have been pursued with little or no regard for experimental verification. In the modern class-room theory and practice supplement each other, the one inspiring interest and encouraging invention, the other disciplining the reasoning power. As in arithmetic, practical work must come first. So soon as a child is old enough to experiment with pencil and compass, ruler, set-square, and protractor, he may begin to form geometrical figures and find out for himself some of their more obvious properties. At the

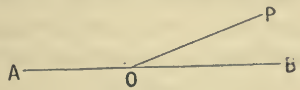


FIG. 10.

same time he will acquire from the teacher a technical nomenclature by which to express accurately the results of his experiments. To correct crude notions, lessons of a conversational type will be found useful. In these, the activity of the pupil in experiment will be accompanied by free expression of his ideas, many of which will need correction. Let him form an angle with two rods and show how, with the same rods, he can form two or four, but not three angles. Ask him how the angle will be affected by lengthening the rods. Let him rotate one rod OP on another AB and describe the variations in the relative sizes of the angles POB, POA. Specially let him note that when the two angles are equal, each will exactly accommodate the corner of a leaf or any other object two of whose boundary lines are 'set squarely' to each other. He

will note that the accuracy of a right angle may be best estimated by the eye when one of the lines forming it is produced beyond the angle, and he will suggest how to test the accuracy of a set-square. The combined use of a spirit level and plumb-line will show how a right angle can always be determined. In these early lessons nothing must be too trivial for the teacher's notice, even the chance remarks of the learner will often reveal misconceptions which need to be removed. A mine of suggestive stimulating questions to be proposed to beginners will be found in an excellent booklet 'Inventional Geometry' by W. G. Spencer, the father of the author of the Synthetic Philosophy. They are carefully graded and were designed 'to bring into earlier activity that highly valuable but much neglected power, the power to invent.' The whole collection of queries, contained within less than fifty pages, forms an admirable introduction to geometrical ideas. In a short preface to his father's book, Herbert Spencer remarks that 'the use of the method implies capacity in the teacher and real interest in the intellectual welfare of his pupils. But given the competent man, and he may produce in them a knowledge and an insight far beyond any that can be given by mechanical lesson-learning.'

Many geometrical facts are conveniently taught by paper-folding. It seems a pity that children who are familiar with paper-folding exercises in the infants' school should abandon them just when they would be of value in geometry. The properties of the square and equilateral triangle, for instance, are conveniently studied by means of paper cut into these forms and folded on lines about which they are symmetrical. Results are compared with the 45° and 60° set squares. Simple as such exercises may be, they will perhaps spare the teacher the mortification of discovering that his pupils have used these instruments for months without noticing

that one is half a square, the other half an equilateral triangle. A few exercises found useful in the class-room are here given :

Draw a straight line AB. Bring the ends together and crease the paper. Unfold, test the angles made

FIG. 11.

by the crease with AB. Now with the compass or ruler show that any point on the creased line is equi-distant from A and B.

Make any angle, preferably a large angle. Fold so as to bring OA on OB. Crease. Unfold. By m.ans of

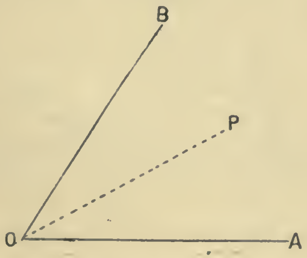


FIG. 12.

the compass show that any point on the creased line OP may be the centre for a circle which will touch OA and OB.

Take a paper triangle ABC : bring B on C and crease to find the centre of BC. Proceed in the same way with the sides AB, AC. Now fold so that the

creases may join the centre of each side to the opposite angle.

Result.—Median lines of a triangle are concurrent.

By further folding, the ratio of the sects of each median is discovered. The in-, out-, and ortho-centres

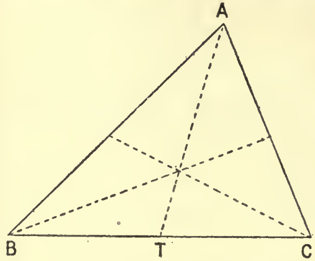


FIG. 13.

of a triangle may be similarly illustrated. Other exercises show the difference between direct and inverse congruence—in fact, there is no end to the folded-paper work which may be devised. It will be noted that the

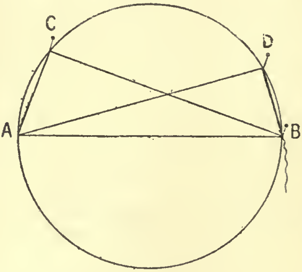


FIG. 14.

first two exercises are valuable for giving the notion of a locus, a subject which appears to have peculiar difficulty for children.

Conceived in a similar spirit are those exercises in which movable threads are used to alter rapidly the

conditions of experiment. For instance, a circle with diameter AB is drawn on the blackboard. A thread attached to A is passed over pins at C and B and kept taut by a small weight. After the angle ACB has been tested by set square and found 'right' the pin C is removed to any other point D and the test repeated.

Again from a point O on the circumference of a circle a chord OA and a tangent OB are drawn. A

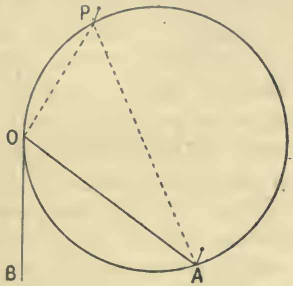


FIG. 15.

piece of paper is cut to fit the angle AOB. A thread is used as in the previous example, passing over P, a point on the circumference. The position of P is altered, but the paper angle always fits the angle OPA.

By such practical work children are early familiarised with experimental proof of geometrical truth. At a later age, when analytical proof is presented, its more rigid method will have no terrors for minds thus trained.

Little space can be spared to remark on the great revolution that is taking place in the presentation of pure geometry. The modern text-book is displacing Euclid's elements, and it is well that this should be. Just as the formality of the eighteenth century seems incongruous with the manners of to-day, when many regret the absence of the statelier graces of the older

period, so Euclid's method seems unsuited to an age whose children make haste to be intellectually rich. But in the class-room the teacher must be ever on the alert to see that no loose disjointed reasoning takes the place of the rigid proofs characteristic of the older method.

When the student passes to higher work he will of course continue to read pure geometry as well as analytic geometry. A recent writer, commenting on the neglect of the former, remarks, 'Although analysis may be more powerful as an instrument of research, it cannot be urged too forcibly that a student who wishes to obtain an intimate acquaintance with the science of geometry will make no real advance if the use of pure geometrical reasoning be neglected. In fact, it might well be taken as an axiom based upon experience, that every geometrical theorem admits of a simple and direct proof—by the principles of pure geometry.'[1]

Trigonometry.

It will be found helpful to introduce the terms sine, co-sine, &c., under their old signification as 'straight line' functions of the arc on which an angle stands. The idea of ratio naturally follows when these lines are compared with the radius of the arc. The ratios are then regarded as functions of the angle, not of the arc. This historical method gives significance to the relative magnitudes of the numbers representing the functions in trigonometrical tables.

The pupil makes a diagram as Fig. 16.

The radius of the arc is regarded as unity. The lines marked sine, co-sine, &c., are the first terms of ratios of which the radius, regarded as unity, is the second term. With such a diagram the terminology of the early lessons in trigonometry becomes less confusing

[1] Preface to Lachlan's *Pure Geometry.*

to the learner, and further, many relations between the functions can be *read* from the diagram.

The prefix 'co-' is seen to be appropriately used when the antecedents of the ratios co-sine, co-tangent, co-secant are lines connected with the complement of the angle θ. If, in the triangles ODC, OAG, OBH, we express the results of Euclid I. 47, in trigonometrical language, we read off at once :—

From ODC $\sin^2\theta + \cos^2\theta = 1$
" OAG $\sec^2\theta = 1 + \tan^2\theta$
" OHB $\text{co-sec}^2\theta = 1 + \cot^2\theta$

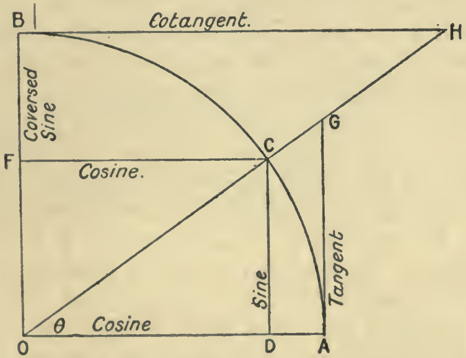


FIG. 16.

When the diagram is drawn sufficiently large on squared paper the reciprocal nature of tangent and co-tangent, sine and co-secant, secant and co-sine may readily be illustrated. On paper ruled to tenths of an inch, with an arc radius of five inches, the pupil has just obtained these values for an angle θ chosen at random:

$$\sin\theta = \cdot 57,\ \text{co-sec}\,\theta = 1\cdot 75$$
$$\sec\theta = 1\cdot 25,\quad \cos\theta = \cdot 81$$
$$\tan\theta = \cdot 7\ ,\quad \cot\theta = 1\cdot 43$$

When he multiplies the reciprocals he will get unity as a product, with an average error of less than 1 per cent. Again, by making use of similar triangles, and with a little practice in reading from the diagram, all the trigonometrical functions may readily be expressed in terms of any one of them.

But the teacher may from the first prefer to base his teaching on the ratios between the sides of a right-angled triangle. Half a square and half an equilateral triangle are convenient forms to begin with. They will be carefully drawn and measured, the ratios tabulated and compared with those found in mathematical tables. These tables ought always to be within reach; the frequency with which they are consulted is evidence of intelligent interest in the subject and some guarantee that theory is not outstripping practice.

When the ratios are mastered, let the pupil proceed at once to measure heights and distances. With a little ingenuity he can construct simple apparatus which will enable him to read angles in a vertical or horizontal plane. For the latter a lath, prepared with sights, is pivoted on the centre of a circle graduated in degrees from 1° to 360°. (Such a card, one foot in diameter, may be bought for a few pence.) The card is pasted on a board and the whole mounted on a camera-stand or table. The level of the board is adjusted by means of a spirit level, and the apparatus is ready for use.

For measuring angles in a vertical plane, a quadrant can be drawn and graduated on paper which has been pasted on a drawing-board. With a radius of eighteen inches a degree will be represented by a distance of not less than three-tenths of an inch. Pupils readily read such a scale to sixths of a degree or even less. The line AB is determined by spirit level, BC by plumb line fixed at B. Sights are fixed at the points A, B (fine screw-eyes or pins will serve for sights). Observers

work in pairs. While one raises the board till the object whose altitude is to be found is in a line with

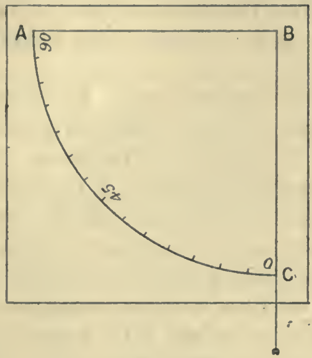


FIG. 17.

AB, the other takes the reading of the arc underneath the plumb line.

The extended idea of an angle to include angles greater than $\frac{\pi}{2}$ is best given by actually rotating a

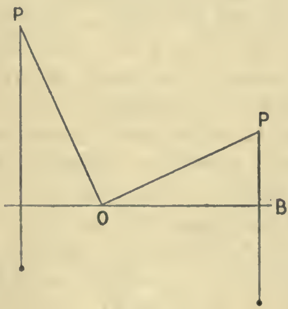


FIG. 18.

rod OP, fixed at O, away from a fixed line OB. If a plumb line is attached to P the pupil will see the variations in the value of sine, co-sine and tangent for the first

and second quadrant. Directional interpretation of algebraical signs has prepared him for the convention which determines the signs of the functions in each of the four quadrants. Graphs will record his observations.

The 'radian' presents some difficulty to beginners. It is a good plan to draw concentric circles and represent the radii by threads. These are carefully fitted, each to its particular circle. If the extremity of each thread is on one straight line drawn from the common centre, then the other extremity of each will be found on another line drawn from the centre, and the angle between the two lines will be recognised as the radian. By this means the pupil gets a new meaning for π. Hitherto he has regarded it as representing the ratio of circumference to diameter. Now he may take π as showing the number of radians in 180°. He also finds that all radians are equal.

The '$a \pm b$' formulæ will probably mark the limit of a first course in trigonometry. The student who attains thus far ought to be capable of carrying on his studies with little outside help. He will have recourse to experiment when beset by difficulties. Whatever branch of mathematics he reads, he will be interested in reading beyond his syllabus.

A word must be added with respect to the working of mathematical exercises. Whether these are for private use or public examinations, it must be remembered that neatness makes for accuracy. Each step in a reasoned process should have a paragraph to itself, all necessary working in arithmetic and algebra, all the working lines in a geometrical construction should be shown. If the last named is part of a demonstration, it should be repeated on each page which refers to it.

FOR FURTHER READING.

Professor Perry, *Practical Mathematics*. Department of Science and Art. 6*d*.

J. W. A. Young, *Teaching of Mathematics in the Elementary and the Secondary School*. American Teachers' Series. Longmans. 6*s*.

W. W. Rouse Ball, *History of Mathematics*. Macmillan. 10*s*.

Sarah Cunnington, *The Story of Arithmetic*. Preface by W. H. H. Hudson. Swan Sonnenschein. 3*s*. 6*d*.

W. W. Rouse Ball, *Mathematical Recreations and Problems*. Macmillan. 7*s*.

Professor Forsyth, *Report of a Committee of the British Association on the Improvement that may be Effected in Teaching Mathematics*. 1902.

Professor J. Perry, *Report of a Discussion on the Teaching of Mathematics*. British Association, 1901. Macmillan.

W. P. Workman, *Tutorial Arithmetic*. Clive. 4*s*. 6*d*. (Contains a Section on 'Congruences.')

Felbecker, *Die Zwölf ersten Rechenübungen*. L. Schwann, Düsseldorf.

Ohlenburger und Würsdörfer, *Rechenbuch in vier Heften*. L. Schwann, Düsseldorf, 4th edition, 1902. Each part 40*pf*.

P. Leysenne, *La Première Année d'Arithmétique: Ouvrage destiné aux écoles primaires*. Armand Colin, Paris, 99th edition, 1898.

La Deuxième Année; La Troisième Année, in the same series.

Cours d'Algèbre Élémentaire conformé aux Programmes de 1902. Poussielgue, Paris. 4*fr*. 50*c*.

Lefèvre, *Number and its Algebra*. Heath's 'Pedagogical Library.

W. G. Spencer, *Inventional Geometry*, with a Preface by his son, Herbert Spencer. Williams and Norgate. 1*s*.

Abbot, *Flatland*. Seeley. (Out of print.)

Syllabus of Practical Geometry. Board of Education.

Geo. Bruce Halsted, *Rational Geometry*. Chapman and Hall. 7*s*. 6*d*.

Lachlan, *Modern Pure Geometry*. Macmillan. 8*s*. 6*d*. (For modern development of this branch of Pure Mathematics.)

H. O. Arnold Forster, *The Coming of the Kilogram*. Cassell. 6*d*.

E. B. Tylor, *Anthropology*. Macmillan. 7*s*. 6*d*. Chapter xiii.—Science.

SECTION VI

NATURAL SCIENCE

1. The Critical Theory of Science.

OF the general conditions of success in the practice of instruction there is one which applies with such particular force within the wide field covered by the term 'science' that it may be considered to be of fundamental importance. It is not sufficient that the teacher should have a competent knowledge of the subject which he professes—regarding this subject as a static body of 'truths' to be known and to be communicated; he must in addition possess an adequate *critical* knowledge of it—that is, he must have considered his science from the point of view at which it appears as a human *acquisition*, the ever-growing result of an active process which is renewed and extended from generation to generation.

The first fruit of such a critical survey of any of the special sciences is the discovery that it contains elements of widely different origin. These may be distinguished as (1) the primary elements or given *facts* that constitute the ultimate data of the science; and (2) certain secondary elements, which may be called *ideal*, since they have their origin in the mind of the investigator and are *added* by him to the data. The whole, composed of a group of primary facts and this 'ideal addition,' may usefully be called a 'secondary construction.'

In the various examples of secondary construction

which the sciences afford, the elements of the two classes are related in varying degrees of intimacy. Thus the meteorological charts which are published from day to day in the 'Times' newspaper represent a case of secondary construction in which it is easy to distinguish between the primary facts—the actual height of the mercury in the barometer at each of a certain number of observing stations; and the ideal additions of the investigator—the 'isobars' or continuous lines connecting the stations where the same barometric height is recorded. It is not difficult to perform the same act of analysis in the case of the mathematical or other formula that summarises the course followed by phenomena of a definite class. For instance, in Galileo's investigation of the velocity of falling bodies it is clear that the primary facts were the distances that his ball rolled down a sloping groove in different times; the 'law' of which he came to regard these particular observations as special cases being the ideal addition. The two elements of the secondary construction are felt to have here a greater closeness of relation than in the former example. The original data seem almost to lose their hard individuality as particular facts through their absorption into the generalisation which has been based upon them. Finally, in such a secondary construction as an 'electric current' we have a case in which the analysis into primary facts and ideal addition demands a considerable critical effort on the part even of a thoughtful physicist.

If we ask for the motive which prompts this elaboration of primary facts into a secondary construction, it is not difficult to find an answer which appears to cover all cases. The secondary construction in every instance aims at rendering the primary facts *intelligible*—that is, at securing for the thinker that *intellectual control* over them which is the necessary condition for practical

control, wherever practical control is attainable. We experience the unique sense of the advent of this 'intellectual control' over a group of facts under various circumstances. In the simplest and most primitive cases facts which presented themselves as new and strange may suddenly assume an aspect of familiarity through our perception of their resemblance to facts that lie well within the circle of our ordinary experiences. The disconcerting vision in the village churchyard at midnight—the 'ghost' which is suddenly realised to be nothing worse than the parson's white mare nibbling grass among the tombs—is an instance of this type of explanation. The yokel to whom the 'uncanny' appearance has suddenly become intelligible resumes the intellectual control of the situation which he had lost in the moment of terror. Even if he does not react in a practical way—with a 'Shoo!' or with a half-brick—upon the object of his recent fright, he at least continues his walk with a security that is based upon a more or less clearly realised power to deal with all probable eventualities of the situation.

Examples of the same explanatory type more relevant to our inquiry are the 'animistic' interpretations of natural phenomena in which savage man and the civilised child alike 'explain' the behaviour of flowers and beasts, the sky and the earth itself, by reading into them the familiar human experiences of emotion and will.

On a higher logical level than this primitive form whose aim is to reduce the new to terms of the familiar stand types of explanation which we may regard as more efficient modes of obtaining intellectual control over facts. For example, any explanation of a group of primary facts which exhibits it as a special case of a general rule or 'law' brings the sense of intellectual control, even when the law is itself less

familiar than the facts to be explained. Thus the world had known that the planets move in ellipses for a hundred years before Newton ' explained ' their movements as a consequence of the law of gravitation. So to an intelligent milkman the familiar fact that cream can be extracted from milk by vigorous rotation of the ' separator ' would be ' explained ' if he could be shown that these phenomena might be predicted from a knowledge of certain simple laws of mechanics.

Finally, it should be noted that any organisation of the facts that brings them into a more or less coherent system may have explanatory value, or bring the sense of intellectual control. This remark applies, for instance, to the organisation of the facts of barometric pressure which is implied by the meteorological charts already mentioned. The addition of the isobars, introducing order into chaos, has at the same time given intelligibility to an otherwise meaningless collection of facts.

The ' Scientific Interest.'

We may conclude, then, that the ' scientific interest ' is the expression of a craving for intellectual control over the events of the objective world. We must next observe that although its roots may be found in the animism of the savage and the restless curiosity of the child, yet only gradually in the history of the individual as in the history of the race does this interest come to be felt as an independent motive to intellectual activity, the reaction to a distinct appeal of the world around us. It is only at a comparatively late stage of the development of science that a body of *savants* could conclude their annual banquet with the toast : ' Here's to the next great scientific discovery—and may it never do anybody any good ! ' At an earlier period of development the disinterested desire to understand the environment has hardly separated itself from the desire of practical conquest over it. Man is willing to be the

minister and interpreter of Nature, but always with the *arrière pensée* that only in that way can he effectively control her course. Thus it has been well said that the scientific industry of Galileo cannot be understood apart from the practical industry of the great arsenal of Venice, whose problems form the starting-point of the immortal Dialogues. Thus, again, it has been suggested with plausibility that much of our older physical science arose in the shape of formulations of procedure made for the purpose of communication from master to pupil in the craftsmanship gilds. At a yet lower level of development the scientific interest sustains neither a continuous nor a separate existence; it is a distinguishable but inseparable constituent of the general reaction of the individual or the community to the environment—a reaction in which emotional, practical, and intellectual tendencies are inextricably intermingled. In the case of the savage this general reaction takes its predominant emotional colouring from the omnipresent dread of the hostile beings with which the environment is peopled—beings whom it is necessary constantly to circumvent or to appease. To this circumstance must be attributed many of his fantastic interpretations of natural facts. Thus by many primitive peoples, ancient and modern, an eclipse of the sun is interpreted as the attempt of some devouring beast or spirit to destroy the fount of life and light—an attempt which, happily, it is possible to frustrate by making sufficient noise to frighten the creature from his purpose. Comparing this 'secondary construction' with that based by the orthodox astronomer upon the same primary facts, it is difficult to resist the conclusion that the difference between the 'ideal addition' in the two cases springs from a difference between the whole attitudes of the savage and the astronomer towards the data. The intellectual elements which in the former's attitude are

entangled in a matrix of emotional and practical reactions have in the case of the astronomer acquired a distinct and self-conscious existence as a genuinely scientific interest which moves to its satisfaction through an ever widening and ever more fruitful process of intellectual organisation of experience.

Hypotheses.

We turn now to a brief examination of the nature of the 'ideal addition' by which a group of 'primary facts' is transformed into an intelligible 'secondary construction.' Without risk of violence to a customary usage which is not very well defined, we may assign to this element the term *hypothesis*, and we may go on to observe that hypotheses fall into three well-marked classes, which correspond roughly, though by no means exclusively, with the three levels that have been distinguished above in the process of evolution of the scientific interest.

1. The hypothesis of the first class suggests a setting of facts not then under observation that would convert the data into a chain of facts connected with one another after the pattern of our established experience. The process by which a detective reconstitutes the circumstances of a crime from the 'clues' at his disposal is an example of the use of this form of hypothesis outside the recognised territories of science; the reconstruction of an extinct reptile and his environment from 'fossil remains' is a precisely parallel instance which obviously falls within. In each case the given primary facts are supplemented ideally by other facts which would exhibit with one another and with the data sequences which are more or less familiar to us by experience. It is obvious that the child who explains the movement of the plant towards the window by supposing that it loves the light is propounding—as do all 'animistic' interpreta-

tions—an hypothesis of this class. But an elucidation of the same phenomenon which appealed to the known influence of light upon the speed of plant growth would fall into the same category. The difference between these alternative explanations obviously consists merely in the nature of the interpolated sequences.

2. In the second class of hypotheses we have the empirical mathematical laws or formulæ which aim at expressing the relations that exist among a group of facts of a certain character. Such an hypothesis would be the law (suggested by simple experiments on a lever) that the 'load' and the 'power' are in the inverse ratio of the 'arms,' or the law of sines in the refraction of light: in short, any generalisation expressed in mathematical terms which suggests, not the interpolation of fresh observable facts among the data, but merely relations between the quantitative features of the data themselves.

At this stage it is convenient to make two observations upon the character and import of hypotheses of these two classes. In the first place, the additions to the data which they contemplate are always thought of as essentially *verifiable*. The facts by which the given primary facts are ideally supplemented in order to yield a series of events conformable with experience may not actually be capable of direct verification at this moment, simply because it is impossible to recall the past. Nevertheless, they are intended to be facts of the same general character as the data, and could in all cases at least be conceived as verified by an appeal to the memory of some other observer or by more indirect evidence. Similarly, though owing to human liability to 'errors of observation,' the mathematical law can never be verified absolutely, yet it is always conceivably verifiable, and in practice can be made probable without limit by observations of increasingly minute accuracy.

In the second place, these hypotheses, while they have the psychological character of explanations, may also be thought of as aiming at the complete *description* of a certain range of phenomena. Thus the hypothesis of the first class 'explains' the given primary facts by tracing out or describing one or more of the complete *threads of connexion* among the events of the universe upon which these facts may be supposed to lie. The second kind of hypothesis, on the other hand, 'explains' by epitomising in mathematical shorthand the description of a vast number of actual or possible individual observations.

3. In the case of the third class—hypotheses that appear when the fully developed scientific interest aims, consciously and deliberately, at organising large masses of facts into systematic connexion—it is not at first sight clear whether either of the preceding observations holds good. When we invoke the 'force' between the sun and a planet to explain their mutual movements, or a 'transformation of energy' to account for the behaviour of an electro-motor, or a 'transference of heat' to account for the simultaneous temperature changes of two bodies, it seems clear that we are not now interpolating between the facts which constitute our data other facts which belong to the same order of experience. No one pretends to know 'force,' or 'energy,' or 'heat' apart from the phenomena which they are invoked to render intelligible. Thus they cannot be said to be verifiable—at any rate in the same sense that the ideally interpolated elements of the first class of hypotheses are verifiable. Their explanatory value rests, in fact, upon a very different foundation. The facts interpolated by the hypothesis of the first class are regarded as 'causes' of the data in the sense that they are facts between which and the data relations of *necessary sequence* hold good. In this sense watering

the lawn is the cause of the growth of the grass; emptying creosote into the river is the cause of the death of the fish. But the hypotheses of the third class are in a deeper sense 'causes' of the phenomena which they explain. If the work done by the motor is an adequate substitute for the electric current that has disappeared, if the heating of the water in a pot really corresponds with the cooling of the hot iron that has been plunged into it, if the hydrogen and oxygen produced by 'electrolysis' truly represent the water that has been 'decomposed,' then we instinctively demand that in each of these cases there shall be something which can be thought of as persisting unchanged beneath the surface of these apparent transformations, and is therefore the constant *cause* of the equivalences and correspondences observed. This is the function which is performed by the notions of 'energy,' 'heat,' and 'atoms' respectively in the examples that have just been given.

If it be asked how the notion of a 'cause' in this sense can aid our intellectual control of the facts which it claims to explain, we may consider a concrete example by way of reply. If pots containing different amounts of cold water are placed in succession above a steady flame for the same interval of time they will become heated, but in unequal degrees. This heating is connected with the proximity of the flame by the very natural thought of the transference of something from the flame to the water. The facts do not *force* upon us a belief in any actual transference of 'heat,' but they are clearly rendered intelligible by the 'ideal addition' of this unverifiable transaction. But the very fact that we have thought of 'heat' as a substance that leaves the flame and enters the water carries with it the necessity of thinking that the same *quantity* enters each of the pots—supposing the conditions of the experi-

ments to be identical except in respect of the amount of water heated. Thus we are prompted to look into our observed results for some expression that, being the same in each experiment, may be thought of as a measurement of the identical quantity of ' heat ' transferred. We find this, with rough accuracy, in the product of the weight of water by the rise of temperature produced in each case. This product is henceforward taken as the measure of the ' amount of heat ' imparted to a quantity of water.

Two further characteristics of our hypothesis should now be clear : (1) It is a notion (here the thought of a ' substance ') taken from other contexts of experience and imported into the given data to make them intelligible. (2) Not only does it perform this function ; in addition, it is an almost indispensable guide to further investigation. To these we may add : (3) That when it has led to a full investigation of the field of phenomena into which it has been invoked, its help is strictly no longer necessary. Thus it is possible to state the laws connecting all changes of temperature between bodies in thermal relations without using the term ' heat.' Nevertheless, the use of the term is of the greatest convenience in making statements upon the relations between bodies whose changes affect one another, and in thinking out further problems connected with them. Thus we may regard the statement that so much ' heat ' has ' passed ' from a body A to a body B as a concise mode of expressing facts of temperature change in A and B, which it would be cumbrous to describe in full, and also as a mode of epitomising the facts in thought which is far more convenient than the representation of them in detail would be. We may conclude, then, that hypotheses of the third class, like those of the former classes, reach their aim ultimately by a process that may be called

description—in the case of the second and third classes 'economical description'—of the actual data, though in the last case this comes about by a process which may well be called a *transformation* of the original facts.

2. Curriculum.

The foregoing outline sketch of the critical theory of science seemed necessary because there is no existing treatment of the subject with which all our readers might be expected to be familiar. We are now free to consider how far the doctrine which we have proposed will determine the aim and scope of the school curriculum in science and the details of the teacher's procedure.

Science, we have maintained, is a process which at its highest development may be described as aiming at complete intellectual control over the course of Nature. Accordingly, the ultimate aim of the teaching of the subject will be to enable our children to take up this part of their inheritance of the long results of time; to develop in them one of the great typical human interests up to the point at which they can appreciate some of the finest fruits of man's intercourse with his environment. Incidentally it should seek to form in them the habits of spontaneity and resourcefulness in intellectual inquiry; and to teach them to recognise in patient and unbiased observation of facts and cautious and well-tested thinking, the prime conditions of efficiency and progress in practical life.

Three Stages.

But, as we have seen, the form of interest to which this aim of teaching is correlative is only the terminal stage of a process whose history exhibits other well-marked stages or levels of progress. It is only in accordance with the best pedagogic experience and theory that a complete scheme of instruction in science should exhibit a course of development in aims and scope which in its out-

line is parallel to the course of evolution of the scientific interest in the intellectual history of mankind. Thus, in accordance with the foregoing analysis, the school curriculum should show the following stages of instruction in the subject :

(*a*) The stage at which the 'scientific interest' is an inseparable element in the general reaction of the young mind to its natural environment. At this stage science teaching should take the comparatively undifferentiated form of 'Nature study.' Children may be considered to be at this stage from the age at which they enter school until, roughly, eleven or twelve years.

(*b*) The stage at which the scientific interest separates itself from the emotional elements of the earlier stage and begins to distinguish and follow up the special lines of inquiry which will develop into the traditional sciences, but is at the same time largely subordinate to the interest in the practical control and manipulation of the physical environment. This stage may be taken as covering the years from twelve until the end of the elementary school period at fourteen, and in most cases until a year or two later.

(*c*) The stage at which the scientific interest makes its appearance in its fully developed form as a persistent and systematic attempt to understand the details of the course of Nature merely for the sake of understanding them. The characteristic feature of the curriculum at this stage is the presence of hypotheses of the third class described above, by the aid of which it is sought to bring wide ranges of facts into systematic connexion.

It may be maintained with confidence that the full educational value of a course of science will hardly be gained by a pupil who does not pass at the appropriate ages through each of these three 'moments' in the study of the subject. It is true that the earlier phases

have values of their own which fully justify their inclusion in the curriculum of the elementary school, where it is impossible that the third phase should be reached; and in secondary schools, where pupils may specialise in some other direction at the age when they would have entered upon this phase. Nevertheless, it must be admitted that the full significance of the earlier work is necessarily lost when it is not completed in the curriculum by a course of science of the fully developed character. On the other hand, in view of the present state of science teaching, especially in boys' schools, it is much more important to insist that a course can never be judged as satisfactory unless the higher phases of the instruction which it contemplates are based upon, and grow out of, the 'Nature study' which represents the earliest attempts to discipline and organise for pedagogical purposes the child's response to his natural environment. Cut off from their origin in this contact with unanalysed Nature, the abstract sciences do not appear in their proper character as the last stages in the intellectual conquest of the original wilderness of unconventionalised fact. They tend, indeed, to replace the student's consciousness of the concrete actuality of 'the round world and them that dwell therein' by a scheme of bloodless abstractions; whereas their proper function should be to enable him to obtain a better view of Nature as a concrete whole through a superior knowledge of the details of her processes. In other words, the special sciences should subserve the fuller development of the pupil's appreciation of Nature as an *intelligible whole*, just as his special training in art should represent the later stages of a growth of the appreciation of it as an *æsthetic whole*, while both science and art should have their common root in Nature study.

It will now be convenient to consider in rather more

detail the ground which our three stages will cover in the complete science curriculum.

(1) Nature Study.

The unknown world upon which the child enters at birth acts as a stimulus to the young mind which results in two states—wonder and curiosity. The former may become the root of love, admiration, fear, &c., and the latter may result in every form of intellectual activity. In education far too little attention is as yet paid to the 'wonder' stage, but it should be recognised as the special business of Nature study to bestow all care on this beginning of emotional life.

Curiosity immediately follows upon the 'wonder' stage, and often quite overshadows it. It is the first outcrop of intellectual activity. There is eagerness, even greed, for knowledge in many directions. The same tendency is noticeable in the animal world, and the passion that children show to touch and handle, taste and destroy everything, has in its earliest phases been said to be due to monkeyish curiosity. The keen desire to discover the how and the wherefore of things leads to destructiveness, and expressions of the same curiosity are truancy and 'running away.' The investigations that follow promptly upon curiosity are characterised by being rough and superficial, and the conclusions arrived at are often illogical.

When children first come to school they are still at the 'animistic' stage, and as they come in contact with Nature there is a tendency to read man and his ways into natural phenomena. The sun gets up from his bed; he looks down upon us; he says 'Good morning' through the window. The stars are little candles, which the angels light in the evening, or they are little bright eyes of the angels winking and blinking. The moon is a big light, a watcher of the night, that is ever ready to discover mischief, or it is a hole in the sky

through which the splendour of heaven is shining, and through which God is looking. In the clouds the children's fancy leads them to see beings of every shape that perform actions of every kind. The wind is a powerful being; it is said to call out, to whistle, or to sleep. Then there is the whole host of beloved beings, which may have arisen from the personification of natural events, such as Jack Frost, fairies, elves, Puck, &c. Stones are charged with mystic forces and values, and become treasures and charms. Flowers seem to meditate and make conscious efforts, and they are laden with meaning. As regards animals, the child interprets all their action in terms of his own mental activity, and sees in them but other selves with the same vices and virtues, needs and desires, with a mental life like unto his own.

The child, then, for whom Nature lessons are intended, is, whatever else he may be, a being with a ready disposition towards wonder, inclined to be emotional, keenly interested, filled with insatiable curiosity, ever ready to try to do something, and ever ready to jump at conclusions. These things must be borne in mind definitely and clearly before any scheme of work can be planned out or methods determined.

It is evident that the little child so endowed should be individually guided and brought into close contact with Nature, so that his emotional side may be trained in the healthiest way, that his keen interest in the outer world may be directed into ever fresh channels, that his flights of fancy may be controlled by constant reference to experienced fact, and that his curiosity may lead to the faithful search for the philosophers' stone. But by far the greater number of children instead of being in direct touch with Nature live in large and crowded cities. There is little opportunity for exploring Nature's treasures in a region of shop

windows and underground railways, and in the noise of restless, feverish life, nor where thirty or eighty children are massed together in one class and taught at the same time, so that individual attention becomes an empty phrase of school doctrine. Yet even under the worst conditions much may be done, and the results of the attempts made fully justify the giving a definite and permanent place in the school curriculum to Nature study.

Apart from its value as an indispensable stage in the development of the scientific interest, it may be held that careful observation establishes the following conclusions. It is through Nature study that the soundest foundations are laid for the life-problems that affect the children in later years. Both sexual and social questions are, by a whole-hearted study of Nature, bereft of undesirable elements, and a healthy view of life and clean and pure thinking will be a powerful support in critical moments, and a force impelling in the right direction. From the perception and study of order and harmonious relationships, the sense of fitness is strengthened, and æsthetic taste receives its earliest training. Further, from the wealth of sense-impressions ideas are accumulated and emotions are awakened which will stimulate and provide material for imagination of the most vivid kind.

Scheme of Work.

As in all other subjects, the scheme of work in Nature study must be graduated in difficulty and complexity. This cannot be emphasised too strongly. Much of the inefficiency of Nature study may be primarily attributed to the fact that this essential point has not been observed. At one time in the year all the classes in some schools study beans, at another all the classes study hibernating animals, and the children will expect beans and hibernating animals at certain times in the

year as surely as mistletoe in December. This state of affairs may generally be traced back to the want of money, of time, and of resourcefulness ; and the scheme shows the greatest economy of these valuable things. At other schools matters are less unsatisfactory. With considerable ingenuity series of 'subjects' are thought of for each class for the year, so that a child will be led to ever fresh fields as he passes through the school. Yet even this does not satisfy the demands of a school subject, for, unless the work is deliberately and continually adapted to the growing, developing child, and implies increasing mental effort, it becomes at best a mere pastime. Further, it is claimed that not only should the lessons in a one-term series be connected, but there should be a definite unity underlying the scheme for the whole school course.

The construction of a scheme seems beset with great difficulty, more especially for town schools, because of the lack of material, but on investigation it is found that some of the difficulty is imaginary. Many teachers think that a new animal, plant, or other object must be produced for each lesson, and find it difficult to meet such a demand. As a matter of fact, this feverish rushing from one thing to another, this craving for something new and exciting, is the outcome of present-day city life, and it cannot but be a matter for regret that the children become *blasés* and superficial through the influence of the school. The various subjects can never claim sufficient attention to become lastingly interesting or to appeal to the children's sympathies, and the most valuable part of Nature-study training is omitted. A seed germinating in a tumbler or lamp-chimney, some frog-spawn or a caddis-worm in a jam-jar, a growing bulb, are easily obtainable and imply more work than the children can ever deal with. Provided the teaching is skilful, interest will increase and sympathies grow.

The following outline of a scheme of work will serve as an illustration of what is possible for most schools; and it contains adequate training for children of various ages:

Autumn Term.

In the early stage the study of different fruits used for food and well known to the children is suitable; also the collecting of leaves showing autumn colouring, the planting of bulbs, and the putting acorns to grow over water. In a later stage the attention of the pupils may be drawn to the conditions which accompany the tinting of the autumn leaves. Pressing and mounting these leaves will require skilful handling. The subject of the red leaves characteristic of the season will lead to the consideration—wherever possible based on actual acquaintance—of a lane at this time of the year. This involves the study of nuts and berries, of gossamer threads and spiders, of snails, of the flying away of birds, and of deserted nests. Weather charts showing in different colours the various 'kinds' of weather would later on furnish valuable data, when a close relationship will be established between the weather and the characteristic signs of the country in autumn. In a still later stage discoveries may be made as to the way in which leaf-fall is brought about, and the part that toadstools and earthworms play in disposing of fallen leaves. The natural dispersal of fruits and seeds further supplies study for the autumn.

Spring Term.

Varieties of seeds are studied in detail; they are, in the earliest stage, planted in soil according to tradition, and their awakening and development is watched. In a later stage the question may arise as to what happens to seeds that do not fall on good ground, and this leads to a long series of experiments (which may be made more and more accurate) to determine the conditions essential to

germination. In the most advanced stage careful measurements of growing parts and weighing of seeds and bulbs at intervals during their growth may with advantage be introduced. The growing bulbs and corms form material for work, and the detailed study of the changes that take place in the growing bulb may occupy the older children. Further, there is the study of early spring flowers, which begins with the merely holding, looking into, smelling, and enjoying the flower, and ends, among older children, with a careful dissection and 'laying out' of the parts, leading to the discovery of the plan on which flowers are built. Again, winter-buds of trees might be studied by the older children, and the stages in the unpacking of leaves traced and recorded. As in the previous and in the following season, weather records should be kept, so that it becomes evident to the children that the changes in the weather are concomitant with changes in things living, and to some extent even bring them about.

In connexion with this work the first attempts to interrogate Nature by physical experiment will be made. Observations on the drying of puddles lead to inquiries into the evaporation and condensation of water, and these in turn to observations of the dryness or dampness of the air by such simple hygrometers as the bunch of seaweed or the stretched hair. By the aid of these instruments the infant science will make its first essays in the prediction of the future: the weather record will be supplemented by the meteorological bulletin foretelling sunshine or shower for the afternoon half-holiday.

The awakening life in the pond provides much interesting study for the schoolroom. The keeping of pond animals in captivity involves the minimum amount of cruelty, and the changes which most of them undergo stimulate the child's interest and curiosity. Of these

animals the newt, toad, and water-snail may be obtained early in the year, and their spawn may be collected and observed throughout the different stages of development.

Here, again, the little ones should have many flowers and enjoy making their acquaintance, while the older children might study them in greater detail. Gradually attention may be drawn to insect visitors, and their contrivances for obtaining pollen and nectar; also to the adaptations that flowers show for such insect visits; and in general outline the process of fertilisation might be revealed to the children. Changeful lives in the pond, as those of the caddis, dragon-fly, beetle, &c., could be traced out by the older pupils, while the little ones would study bees, wasps, house-fly, butterfly, and moth. Rambles and excursions are an essential factor in this work, and it is only through them that children realise the setting of the treasures they are studying, and the close interrelation between these and their environment. Thus they come to see things in their true proportion.

Summer Term.

Again, by watching the child, some clue may be found as to the way in which schemes may be made progressive. It will be noticed that in the case of a young child observations are determined by the principle of novelty; all things that are intellectually new are interesting to him. It is a case of merely noting one fact after another; there is no explanation, no close investigation, no experiment, simply seeing and taking pleasure in seeing. Older children who have been encouraged in their interest in outdoor life will take interest in changes, in comparison of states of things with previous states; next comes interest in investigation and in the search for causes. Thus the way is

indicated in which schemes may be graduated in difficulty and adapted to the developing child.

(2) Intermediate Stage.

The three stages into which we have divided the curriculum in science are not, of course, intended to mark abrupt transitions in the nature of the work. On the contrary, such abrupt transitions are forbidden by our conception of science as a gradually developing process. Already towards the end of the Nature-study period the use of the measuring rule and the balance has prepared the way for the quantitative study of certain widely occurring factors of natural phenomena which are usually taken as the material for a course of 'General Elementary Science.' Similarly at the end of this intermediate period we have the beginnings of that systematic development of a physical or chemical argument which is the special characteristic of the last phase of science teaching. On the whole, however, the work of this period presents distinguishing marks which separate it clearly from the foregoing and the following periods. It deals with series of *topics*—such as *temperature, specific gravity, the nature of burning, the laws of pulleys*—rather than with the development of a continuous subject. The topics are abstract—as opposed to the concrete topics of Nature study—and the treatment is in general more or less definitely quantitative. These abstract topics are as a rule studied not for their own sake but for some external *application* to which the study may lead—for the sake of something which answers to the 'practical control' over phenomena that is sought in the corresponding stage of the history of science.

During the first year of the period one important section of these 'topics' will be in continuation of the simple observations of sky and weather in the earlier period. Quantitative measurement begins to replace

qualitative observations in these fields. The calculation of the amount of rainfall by the gauge ; the exact determination as 'temperature' of what has hitherto been recognised vaguely as heat or cold ; the precise conditions of the evaporation and condensation, the freezing and melting of water ; the clear conception and measurement of the pressure of the air : these are obvious topics which arise in the consideration of 'weather'—just as observations on the variation of the length of shadows at noon ; of the changes in position of moon, planets, and sun among the stars ; of the hourly movements of all these bodies, will be a natural extension of the simple non-quantitative study of the sky in the Nature-study period.

The fact that it is now becoming customary to include many of these topics in the course of 'practical geography' is not to be taken as an argument against giving them a place in the science syllabus of the intermediate stage. This particular form of 'co-ordination' of elementary science and geography is merely an application of the principle, which we based upon our critical study of science, that at this stage the scientific interest does not naturally pursue its aim in complete detachment from other interests and needs. It will address itself to the study and elucidation of more or less isolated topics that arise in the course of some pursuit that has a continuous self-supporting interest—here the continuous subject of geography. It may, of course, pursue this study beyond the point to which it need be developed for the mere purpose of application to the problems in which it took its origin : for example, the study of *expansion by heat* which arises in connexion with the problem of finding a reliable objective index of changes of temperature proves to have an interest of its own which may carry us as far as the determination of 'co-efficients of expansion.' But it remains true that

on the whole the scientific development of such topics will not wander far from the needs of actual application; that the inquiries undertaken will in themselves lack the systematic coherence which an hypothesis of our third class will give them at the later stage; and that the systematic unity which is a prime essential of any course in science will be supplied *ab extra* by the relation of these topics to the continuous geographical argument in which they take their rise.

It is, perhaps, not merely fanciful to argue that geography, which may be regarded as giving a generalised account of man's practical dealings with his material environment, is almost necessarily the subject of the curriculum with which should be correlated the instruction which represents the second of the three phases in the historical development of science.

But the topics which will in this way be correlated with the instruction in geography do not exhaust those which it is customary to include in the syllabus for the first two years of the period under consideration. Exercises in measuring and weighing, leading on the one hand to a more or less extensive study of the mensuration of plane and solid figures, and on the other to the study of density, specific gravity and the more important static properties of fluids, undoubtedly demand a place in the course. With regard to these topics we would maintain (1) that mensuration problems are not the proper concern of the science teacher at all. They should be regarded as portions of the syllabus in mathematics in which laboratory methods happen to be applied. These portions are commonly treated in the physical laboratory, which for the time being then becomes a mathematical laboratory. In some schools, in fact, separate accommodation and equipment have recently been provided for such work under the latter title. (2) Exercises involving weighing

and the more direct modes of determining density and specific gravity should be included with the topics just mentioned, since their interest is strictly not physical but mathematical. (3) Only when facts have to be explained by aid of a physical hypothesis—as in the cases of Archimedes' Principle and the theory of the barometer—should these topics be considered as falling within the province of the science teacher.

During the second half of the period under consideration—roughly during the ages thirteen to fifteen—the topics studied will assume a more coherent and systematic form. The study of interesting problems of the character recognised later as 'chemical' will be taken up, but will now exhibit the sequence of a continuous argument in the course of which the investigation of the salient phenomena of burning and breathing, the 'composition' of water and the reactions between acids and alkalis and the common metals will at least find a place. The syllabus of instruction should have such a range and be so carried out that by the *end* of this period pupils should have reached a clear view of the fundamental problem of chemistry—to be able to regard the various transformations which matter undergoes as expressions of the combination and separation of persistent unchanging elements; and shall have become convinced of the truth of its fundamental law—the constancy of quantitative relations in chemical transformations, including the 'principle of the conservation of mass.' In the case of boys the chemical discussions will frequently find their starting-point in the attempt to understand simple and familiar processes in the arts and crafts; in the case of girls they will as frequently arise in connexion with problems in domestic economy, or in the more specialised and 'scientific' Nature study of this period. But the syllabus must not be impoverished by restricting it to such

problems: we are now dealing with a stage at which both boys and girls are quite capable of following with interest the development of a genuine scientific argument so long as it keeps constantly in touch with interesting problems of practical life.

Later, or perhaps simultaneously, boys should take up in a similar spirit the study of mechanics. The investigation of such familiar topics as the bending of beams, the stretching of wires, simple frame structures, pulleys, levers, cranes, &c., 'work' and the 'efficiency' of machines, centres of gravity, friction should be systematised into a coherent mechanical doctrine. This doctrine will not, of course, be based upon the conception of the fundamental units of space, time, and mass. Such a logical treatment of the subject should obviously be postponed to the final stage. 'Force' will be measured in terms of 'weight,' without any attempt at the scientific analysis of this conception. The 'vector' and 'rotor' (moment) properties of forces will be established experimentally and applied in the analysis of the simple statical phenomena indicated above. Much attention will be paid in this connexion to accurate and intelligent graphical work.

In some school courses the simple study of vectors is now regarded as part of the syllabus in geometry. This excellent custom may well be extended so as to include in the course of practical mathematics the study of velocity and acceleration, which strictly are not physical notions at all. This study pursued during the present period will find its application in the more fully developed mechanics of the final stage.

With regard to girls it is becoming more and more generally recognised that this stage in their training reaches its highest value in the biological sciences. Emotional and æsthetic elements still have their place, and the study, therefore, meets with more ready response

on the part of the girls than do the much more exact and purely intellectual forms of science. For a short time, during a period of somewhat unbalanced enthusiasm for 'experimental science' and of reaction from the purely dogmatic teaching of botany, the latter subject was swept aside and was at best considered a refuge for the intellectually destitute. But now school botany has also become quickened by the spirit of reform, and instead of consisting of a mass of information which was poured into the patient minds of the pupils, it shows all the distinctive features of science.

At this stage, when it is emerging from the more advanced Nature study, botany consists of a series of topics, and, as in the experimental science, these are not studied for their own sakes, but in order to render intelligible the life of the plant which through previous studies has become a matter of interest. It is now evident that the plant is alive. Does it live as we do? Does it breathe? There follows a series of experiments carried out either by the pupils or at their suggestion by the teacher, and leading to such discoveries as the following. Plants grown in the absence of air die. Seedlings and older plants take up some part of the air surrounding them. The part of the air that is left has different properties. The part that is left occupies four-fifths of the total volume of air which surrounded the plant. The plant gives out a gas. This gas does not seem to be the same as that taken in, as it does not make ordinary 'air' with the gas that was left. Water vapour is also produced by the plant, and heat is evolved. The giving out of water vapour, of a gas which turns lime-water milky, and the evolving of heat are features of our own respiration and that of the animals; therefore it seems probable that the process of breathing is similar in living things. (This

work would obviously reach its completion in correlation with the study of burning and rusting.)

Other topics that would follow in succession are: Transpiration, assimilation and the general problems of nutrition, cross and self pollination, fruit and seed formation and dispersal, plant communities, &c.

Botany is at this stage essentially biological and physiological, and if faithfully carried out on the lines of heuristic teaching it will supply valuable training in exact manipulation and reasoning, for which experimental science is so highly valued.

It is a common practice to make elementary botany consist almost entirely of flower description and of systematic classification—but it will be found that the above topics afford more opportunity for fostering the scientific spirit of investigation and for satisfying the natural curiosity of an active healthy mind. All more advanced morphology and *systematic* botany will have their place later when plant life has become intelligible.

The distinguishing marks of the work during the school period that sets in at about fifteen years of age are

(3) Final Stage.

(1) that the special aims of the individual sciences studied are clearly realised; and (2) that systematic completeness of development of the sciences becomes itself the main object in view. This does not imply, of course, that the instruction avoids the contact with practical problems which was sought in the intermediate period: it means merely a shifting of emphasis from the practical in the direction of the purely intellectual interest. It now becomes legitimate to invoke the hypotheses of our third class—atoms, molecules, heat, &c.—to assist in the task of 'economical' (though 'transformed') description of the wide ranges of facts that form the subject of investigation; and it becomes legitimate to place such subjects as mechanics on a logical basis.

It would not be profitable to attempt to determine the scope or even the character of the syllabus of this stage. It may be urged that every boy and girl in a secondary school should before the age of specialisation pursue at least one of the special sciences sufficiently far to obtain a sympathetic acquaintance with the character of the scientific ideal. In the case of boys this science will generally be chemistry or one of the branches of physics ; in the case of girls it will more probably be botany. Boys and girls who devote special attention to science during the last years of school life may pursue several of these sciences in relative independence of one another and will reach a standard of knowledge that is limited only by the amount of time and ability devoted to the subject by pupils and teachers.

3. Method.

According to the critical theory the special function of science is not so much the discovery of facts as the *organisation* of facts when discovered —although of course, in practice, the attempt to organise known facts invariably leads to the discovery of a great many hitherto unknown. The 'hypotheses'—whether or not they are regarded as 'causes'—are not themselves *facts* hidden behind the veil of obvious phenomena, facts which scientific scrutiny aims at bringing to the light. They are rather the *instruments* by which the intellectual organisation of the actual data is carried out.

The bearing of this doctrine upon the method of science teaching is perfectly clear. Class work in science will fall under two heads : (1) the determination or 'discovery' of primary facts ; and (2) discussions which aim at organising these facts so as to render them intelligible, or reduce them to 'intellectual control.' Of these two moments or phases in the teaching process the second *must* wait upon the first. Any theoretical elaboration of facts *must* be preceded by the determina-

tion of the facts to be elaborated. It follows that no arbitrary separation of 'theoretical' from 'practical' work can be legitimate. The proper aim of practical work will not be to give facility in experimental manipulation, nor to supplement the theoretical work, nor even to give opportunity for the application of theoretical results. It is to supply the foundation of 'matter of fact' upon which the scientific 'construction' may be built; to be the starting-point of a process which must ever be regarded as in the strictest sense a single whole: though the emphasis of interest may at one moment be upon the determination of facts and at another upon their interpretation.

'Practical' and 'Theoretical.'

The antithesis between practical work and theoretical work inevitably suggests the alternation between the laboratory and the class room. It is important, therefore, to point out at once that the canon of method just laid down applies just as unequivocally where (as is generally the case in an elementary school) there is no possibility of providing for individual experimentation, as where laboratory accommodation is freely available. The 'practical work' will in this case be done in the main by the teacher—though his part may be most usefully supplemented both by inviting individuals to co-operate in performing experiments and in making measurements before the class, and also (in certain subjects) by setting the class to collect data out of school hours for subsequent theoretical treatment. The true point—so important that we make no apology for constantly reiterating it—is that whatever the circumstances of the teacher may be, he cannot be absolved from the duty of presenting his subject to his class in the one form which does not misrepresent its true nature—that is, as a series of attempts to obtain 'intellectual control' over *given* facts.

The results of this discussion may be summarised in the *dictum* that method in science teaching must take the *form* of an investigation. For in an investigation the facts must be established before an attempt can be made to interpret them. But it is important to note that it does not necessarily lead to the 'heuristic method' as the latter is described by its chief exponents. It is the great merit of this method that by insisting that the pupil shall be put as far as possible in the position of an original discoverer it ensures incidentally that fact and theory follow one another in the proper order of sequence. But, as we have seen, to secure this result it is not necessary that the facts should be established by actual individual experimentation and observation, although there can be no question that results obtained in this way have immensely greater value, as data for the scientific process, than those established by demonstration. On the other hand, the defenders of the heuristic method have not always distinguished with the necessary clearness between the two phases of scientific discovery—the actual determination of the facts and their organisation into secondary constructions. Granted that the facts *are* facts, open to all and the same for all,[1] it must be remembered that the 'ideal additions' contain, in general, *conventional* and not strictly necessary elements which can find their way into the minds of the pupils only by 'suggestion' from the teacher or from some other external source.

Method of Investigation.

Heuristic Method.

In fact no conception of the process of investigation can be a trustworthy guide to method in science teaching

[1] *I.e.* neglecting the influence of suggestion and 'apperception upon the *selection* of facts for attention.

if it neglects any of the important features of the process by which the special sciences have actually assumed the individual characters which they have at present. In brief these features are: first the 'induction' of a general conception or law from a certain group of facts, often extremely small in number.[1] Then comes the application of this generalisation—which will be held in different cases with varying degrees of conviction—as a guide to further investigations. In this capacity it serves many investigators besides its original discoverer, and its success or failure in their hands will in the main determine its ultimate acceptance or rejection. Finally, in the case of the logically more 'perfect' sciences, attempts will be made to 'deduce' the induction in question from some more general principle—that is, by means of an hypothesis of our third class to show that it occupies a definite position in a unified system of generalisations. The reader may profitably illustrate this process for himself by considering (for example) the history of Avogadro's law; of the 'freezing-point' method of determining molecular weights; of Faraday's law of electro-magnetic induction; or of Joule's mechanical equivalent of heat.

We must not fail to note that only the last phase in this movement is in the strict sense a 'proof;' and that this proof can be reached in the teaching of the subject only in the last stage where the organisation of scientific 'truths' is undertaken in a form which is due to the work and influence of generations of investigators, and should frankly be taught as such. The second phase again must in the school course be represented to a large extent by *information* given by the teacher to supplement the facts determined by the

[1] *E.g.* Dalton's *Atomic Hypothesis*, Gay Lussac's *Law of Gaseous Combination*, Avogadro's *Law*.

class and to confirm their interpretations of those facts. Finally we urge that it is essential to the disciplinary value of science teaching that the critical attitude should be maintained; that the pupil—at least from the later stages of the Nature-study period—should be taught to estimate the proper logical value of the interpretations of facts adopted by the class at different stages of their progress.

History of Discovery.

We have already remarked upon the value of the history of a science as the source of correct views upon the general method of development of the subject in teaching. It has often been observed of late that first-hand acquaintance with original scientific memoirs may also be a most useful guide to the teacher in choosing the details of his exposition. Its most important service is to enable him to see what is the proper point of departure for the treatment of his problems so that this treatment shall form part of a natural, inevitable and continuous argument. In other words, it enables him to cut himself free from the point of view at which as an adult student he sees his subject as a developed, logical whole, and to take up the point of view of his pupil to whom it is a developing psychological process. Thus that somewhat unpopular generalisation known as Boyle's Law is welcome enough if, instead of being taught as a 'property' of air, it is introduced (as it was discovered) in the course of an argument to establish the vacuum theory of the barometer.[1]

History is, however, a guide that must be followed with discretion. The teacher, knowing what was always the actual though not always the visible goal of the history of his subject, must idealise its course,

[1] The account of Boyle's experiments 'Touching the Spring of the Air' is contained in the Alembic Club reprints.

ignoring all movements which were irrelevant to the main advance. Thus while the argument which leads to the belief in the complex nature of air may most usefully be founded upon a first-hand study of Scheele,[1] the teacher need not hesitate to ignore the worthy Swede's obsession by the phlogiston theory.

Our further observations upon method will be made under special headings corresponding to the three stages of the curriculum.

(1) Nature Study.

Nature study means truly the study of nature, the animate and inanimate environment as far as that has not been materially altered by the art of man. The scope is wide and the material for study unlimited, but conditions impose limitations. Where in the country school Nature presents her treasures at the very door of the school, in the city school it may be difficult, at certain times of the year, to find material for a single lesson; and where in a cultured home the child may be accompanied in his rambles by a sympathetic friend who will aid him in his searches and studies, there are schools where sixty or seventy children in a class have lessons of forty minutes' duration, a great part of which is spent in giving out material and taking it up again. So numerous are the limitations in many cases, that there remains no freedom of choice, and the burden becomes heavy. But even then the efforts are worth making.

Materials.

Where there is possibility of choice left, what materials are most suitable? There are certain general conditions that must be fulfilled. First, the material must be real and actually present before the children, so that they can see it directly, not through the eyes of others, and can

[1] Scheele's treatise 'Von der Luft und dem Feuer' is reprinted in Ostwald's *Klassiker*. (See references for further reading below.)

actually touch and investigate it. A picture, however good, implies that another mind has come between the child and the object, and first-hand observation is impossible. The same remark applies to descriptions, word-pictures, however excellent they may be. Next the material for study must be seasonal. This arises more or less out of the above condition. Of necessity blue-bells must be studied in spring-time and blackberries in the autumn. There is still, however, ample opportunity for mistakes in method, as when the work of roots is studied in mid-winter, when all the roots are asleep, or seeds are made to germinate in December in a warm cupboard.

Why should the seasonal aspect of things be emphasized at all costs ? We aim at representing nature at any given time of the year as truthfully as it is possible for us to do. As we come into contact with each living thing we find that its general state is the effect of which the sun is primarily the cause. It is found that as the length of the rays of sunshine varies in the course of the year, so the condition and general appearance of things change ; also the intensity of vital activity varies inversely with the length of the rays of sunlight and therefore varies with the seasons. The all-pervading influence of the seasons is still dimly discernible even in human lives and is so important a factor in natural environment that no true conception of the latter can be obtained without it.

Out of the above arises a further condition which must be fulfilled in the choice of material, viz. that all material shall be represented in its setting. Nature study claims to precede the 'Sciences' ; it therefore regards Nature as a whole and natural objects as threads in a web of infinite complexity—it knows at the outset of no analysis, of no classification. It recognises that objects of Nature are, in part at least, products of their

environment, and the very clue to their meaning lies in their surroundings. It follows from this that the study of any object apart from its environment cannot be called Nature study, in the technical sense of the word.

The requirement can easily be met in the country where all natural objects are seen in their setting and can be studied in relation to it. In most town schools circumstances forbid the observance of this condition to any satisfactory extent, but on no account must it be entirely ignored. Plants in pots and boxes, arranged to imitate their natural haunts, pond animals in aquaria representing miniature ponds, excellent pictures and descriptions of the homes of wild creatures by first-hand observers must to some extent supply the want, and occasional rambles and visits to parks and fields must be made possible.

Apart from these circumstances, the choice of material depends on the taste and training of the teacher and the locality of the school—in many cases even on the discretion of the park-keepers who send boxes of cut specimens to town schools. The question is often discussed whether Nature study on inanimate things is preferable to lessons on animals and plants, and the only conclusion that can be arrived at is that, since Nature study is unspecialised, all the aspects of Nature should, ideally, receive equal attention, and since this is only possible in the country, compromise must again be resorted to in the form of regional survey, using for the 'region' a rubbish-heap, a back-yard, a window-box, a park or a field, and faith must ever be established in the old saying that every corner of the world represents the universe.

Bearing in mind that all natural phenomena may receive attention, it is nevertheless true that in the study of *living things* the most valuable training for the child is involved.

With regard to the method of conducting the actual lessons, hard and fast lines cannot be laid down. The methods of teaching range between the two poles of which the purely dogmatic is one and the purely heuristic is the other. Since Nature study is science, purely dogmatic teaching where all information is supplied by the teacher more or less in lecture form receives no sanction. On the other hand, purely heuristic teaching, where the pupil is placed in the position of an original discoverer and the teacher merely suggests fresh problems, is possible only in very rare cases. Ideally, there is no doubt, heuristic method is right for Nature study, but as long as life is short and limitations are binding, purely heuristic method must be abandoned for most schools.

Procedure.

It has been argued that if all the Nature lessons in a child's school course were given to the heuristic study of a single seed and its growth, or to the solution of a single other problem, the child would be in a better condition intellectually than if he had had a certain amount of information supplied to him to supplement his own investigations. Whether this is so or not surely depends largely on circumstances. If the children in a school belong to a class in society to whom outings and holidays in the country are a matter of course, and where some member of the family has leisure enough to take an interest in the children's doings, and where in many cases Nature study is continued as the study of science in school or in college, then purely heuristic teaching is of the utmost value. But in other circumstances where woods and fields are but parts of dreamland, where to make a shift for a living engrosses the attention of all members of the family, there surely Nature study should aim at widening the outlook by all possible means.

Whatever method be adopted for the Nature lesson,

it is important to note certain facts. Bearing in mind the powerful influence of 'first impressions,' too much attention cannot be paid to the actual handling of the material. Many a carefully planned lesson comes to grief because the teacher hastily jerks or flings the specimens to the child when the time for giving them out arrives. A thing that can be so roughly treated is not worth much; yet one aim of the lesson is to lead the children to appreciation. If there is discord between the treatment given to the material and the aim of the lesson, the teaching that follows necessarily suffers. Specimens displayed and given out with due regard to their beauty or other worth tend to be straightway appreciated, and by this simple act the teacher supplies far better training to the class than by any number of remarks in praise of the object.

It may be pleaded that there is no time for such careful distribution of specimens. The difficulty is real, but not insuperable; a certain amount of time need not be grudged to the distribution, seeing that it touches the object of the teaching so closely. Much time in the lesson can be economised by careful preparation beforehand. If two or more kinds of specimens are required for one lesson, *e.g.* twigs with winter buds from different trees, these may be tied into as many bundles as there are children, or groups of children working together. Cardboard trays, as used by fruiterers and confectioners, can be filled before the lesson and used for fruits, bulbs, toadstools, &c. Besides presenting the material in a pleasing manner, these trays greatly help in keeping an ordinary class-room tidy. They can be used over and over again. In some hand-work lesson the children might make their own brown paper boxes and trays to be used in the Nature lesson.

For the convenience of teachers it is often arranged

that the Nature lessons follow immediately upon recreation or take place in the first teaching period of the morning or afternoon, in order that specimens may be given out beforehand. This plan has satisfactory results, if the lesson is to be the continuation of some previous study, *e.g.* the measurement of growth in plants under observation; but if the lesson is to be on a new subject, *e.g.* blue-bells when primroses were examined in the previous week, then the whole lesson is spoilt by this method of procedure.

Nature lessons, as other lessons, should have carefully prepared introductions, bringing to the foreground of the mind such parts of the previous lesson as will form the apperception material for the new work and leading up to the presentation of the fresh material; but this is not possible when the fresh material is already presented to the eyes of the children and occupies their attention and stimulates their curiosity. The material must be kept out of sight in such cases until the right moment.

Inexperienced teachers sometimes forget that for a few minutes after the giving out of specimens children should be left alone and not worried with the ever-recurring question, 'Who will tell me all about it?' or 'Who will tell me something about it?' There must be time not only for study but more especially for enjoyment. Many a little child utters an exclamation of surprise and pleasure and is hushed with the remark that he must examine the specimen carefully so as to 'know all about it.' It is most undesirable that undue prominence be given to the emotional in nature lessons and sentimentality encouraged—yet to suppress all perfectly natural and spontaneous expression of feeling is neglecting one aspect of mental activity instead of training it.

The more completely heuristic methods are adopted,

the less prominent will the teacher be in the lesson; at any rate, the less will the teacher shower questions upon the class to which answers in single words or single sentences can be given. Unfortunately conditions are such in many schools, where the classes are very large, that the teaching must consist of numerous questions addressed to the children in succession, so as to keep them all occupied and so as to test the work of them all. Here incessant questioning is a necessary evil, but it is one which need not be fostered when the classes are small and it is possible for a teacher to test the work of each individual by simply directing and supervising and from time to time encouraging the children to speak on the subject of their discoveries.

It is in the questioning and answering and in the explanations given that a distinctive feature of Nature study becomes evident. In the earliest stages the work done by the pupils consists of simply noting appearances and describing and recording these and commenting on them. These comments soon consist of comparisons; a flower is said to be like a little star, bell, thimble, or the head of the dragon-fly larva is like that of a kitten. Here there is evidence of observation being brought into relation to past experience of another kind. Gradually the search for causes begins. Why does the stem of the plant in a room bend towards the window? Why does the fish open and shut its mouth? Only too frequently these questions are asked by the teacher long before it occurs to the little ones to ask them. It is interesting to investigate the answers. 'Because the plant loves the light, it turns to the window,' 'because the fish is frightened, it pants,' are 'explanations' given by children. Now these so-called explanations are in reality extensions of the above comparisons. The plant bends to the light as if it loved the light. The fish pants, as we do when

we are frightened. Again the observation is brought into relation with past experience of another order and interpreted in terms of the latter. This looks like an explanation, but gives no account of reason or cause or ways or means.

This form of answer to problems is characteristic of children and satisfying to them, but it is surely a mistake if teachers, making no advance on the children, give similar answers and call them explanations and reasons. This is a loose and inaccurate way of thinking and speaking. The teacher may not go so far as to say that the plant loves the light and therefore bends towards it, but he will say 'the plant turns to the light because it is heliotropic,' which is saying the same thing twice over. 'How are the leaves supplied with moisture?' 'The root *sucks* it up from the soil and *sends* it up to the leaves. The flowers want the insects to take their pollen to other flowers of the same kind, so they store honey in their petals.' Now a child at the anthropomorphic stage, reading man and his purposes into beast and plant, may give such explanations. But when he has passed that stage he should be led to state as fact only what his observation and previous knowledge warrant him so to state; the teacher should do this always. This is not mere pedantry, but speaking the truth exactly as far as it is known, a practice which should commend itself to all and is absolutely essential to science work.

But although such inaccurate speaking must be strongly condemned, the relation of admissible explanatory notions to the facts which they are to explain is similar and is characteristic of Nature study. It will be found that all such 'explanations' as are attempted fall into our first class of 'hypotheses.' New experiences are interpreted in terms of the old of the same kind. For instance: seeds germinating in the

dark have shoots which are much longer than those of similar seeds grown in the light, all other conditions being the same. The like consequence is noticed with sprouting potato tubers, onion sprouts and many other parts of plants. The conclusion arrived at is, that light checks growth and in the absence of it growth in length is vigorous. The plant on the window-sill has one side of its stem exposed to the light, the other side has less light. From the foregoing it is concluded that the front stems will grow less fast than the side away from the light, and curvature is the result. The answer to the question, 'Why do plants in a room bend towards the window?' now is, that in consequence of unequally distributed light, there is unequal rate of growth and consequent curvature. The cause in the deeper sense is not yet known. As our earlier pages have already shown, this form of causal explanation simply introduces other facts of the same order to bear out the point in question. No other forms of explanation are attempted in the Nature-study stage.

In close connexion with the work of investigation, drawing and colouring should be encouraged. A careful representation of the appearance of an object is the most concise and yet comprehensive form of description, therefore the best form of record of facts observed. Incidentally sometimes, and with definite purpose at other times, the drawing may be used as a valuable aid in the æsthetic training of the children. The spontaneous outburst of feeling evoked when the specimens were given out may now become a definite desire to imitate, to fix and to retain; in drawing and colouring the desire will reach its fulfilment. It is desirable on the whole to abstain from presenting diagrams to the children, or inducing them to construct them, as diagrams imply, especially in the case of little children, generalisations which have not been duly mastered.

A few words on the subject of 'illustrations' for Nature lessons may at this point be of some service. From what has gone before, it is clear that illustrations should only be used to supplement the main part of the work. In country schools the only function they discharge is to serve as records of past work in revision lessons or in similar circumstances. In town schools the case is different. Special stress is laid in Nature study on the environment of our objects and yet again and again it is impossible to present it. We may show a dormouse in a cage, but it is the dormouse in the old hazel-bush that we should be studying. A vivid description may to some extent call up mental pictures of the scene and form a background against which the dormouse may be studied, but in view of the fact that many children do not easily form mental pictures, and in view of the fact that among poor children many have not had the necessary experience to ensure correct visualisation, pictures are often more useful and adequate. They must, however, be used with caution. Experiments with children have again and again shown that pictures, but especially outline and black and white drawings, are by no means fully understood by the less cultured. Indeed they very often convey a totally different and distorted meaning to the minds of some children. The younger and the less trained children are, the bolder and simpler the pictures intended for them must be, and colour is an essential feature.

The value of these formal Nature lessons is greatly enhanced by the informal Nature study that should be carried on at all times in the class-room. The window-sill may show on a small scale the pageant of the seasons, and the latter may be made more and more evident by a demonstration table whose ever-changing appearance is ensured by a supply of seasonal plant-cuttings arranged

suitably in vases and jars. Nature-calendars, much beloved by children, encourage their being ever on the outlook. The value of a series of seasonal pictures appearing and disappearing on the wall of the class-room cannot be over-estimated.

Nature-Study Rambles.

It is a sign of better times coming that school rambles in connexion with Nature study are gradually being admitted into the workaday curriculum. The time is past when they were looked upon as belonging to the same class as school treats, picnics, and other outings. All enlightened teachers are now ready to admit their educational value, and if they do not carry their opinion into practice it is simply because they foresee almost insuperable difficulties in the way.

In the case of the country school the matter is perfectly easy, but what of town schools, where it requires walks through the traffic of crowded streets, omnibus rides, and intricate railway journeys before places are reached that display beauty of scenery and material for our little naturalists? The case becomes still worse where funds are so limited that the railway fares mean an outlay which we are not justified in incurring. Here as elsewhere all that can be urged is, that if conditions are favourable rambles should be frequent and form an integral part of the school work, and where the way is barred the obstacles should be removed by a great output of will and energy at least once a year. That it can be done has been amply proved by several of the London elementary schools where conviction, determination and clever planning have secured happy and profitable hours to children from sordid homes.

How invaluable excursions are for our work in Nature study will be realised, when we remind ourselves that in following the lines of the evolution of the study of nature by the human race we start with a general

survey, a general 'making acquaintance with,' before we proceed to analysis and classification. In a school ramble we see our opportunity for this. Further, we know that it is only by constant reference to the things as they are, in their relation to each other, that they are regarded in their right proportions; and finally we know that it is only by the aid of a knowledge of the environment of natural objects that their peculiarities can be interpreted and rightly appreciated. Fully organised excursions will meet these requirements.

Experience has shown that it is unreasonable to expect that children who are not accustomed to school rambles will give undivided attention to the scientific study of nature the first time the experiment is made. The more completely it is new to them, the more will it mean a reaction from the more formal work of the class-room and the less will they be able to concentrate attention on one aspect of the excursion; but as interest in natural history is intensified it will displace interest in play for the time being, and the excursions will imply genuine intellectual effort on the part of the pupils.

Too much stress cannot be laid on the necessity of fully organising the expedition. It is essential that the teacher, some days previously, should go over every part of the ground which is to be explored by the children in order to deal with any unforeseen event, and in order to select special points of interest and prepare himself to direct attention to these. This is specially important where time is limited and much valuable material has to be accumulated in a short space. If the class is small and the children young, they may be treated as independent discoverers. It is desirable that observation should be absolutely unrestricted; to permit and to facilitate the joy of discovery should be the first aim, and the individual taste of the children alone should

guide their general investigation. The teacher should be to the children as a friend who shares delights and stimulates interest, as a general adviser who suggests ways and means, and as a reference book which can be consulted. The special business need not be lost sight of. The children should be carefully prepared for the excursion, they should be told what the main object is, and definite lines of investigation should be suggested to them beforehand. They should be required to collect facts and material which will be needed for subsequent lessons. The more interest and curiosity are awakened beforehand, the less will there be any chance of their natural energies seeking an outlet in mere play.

In the case of large classes, especially of older children, it has been found most useful to provide the children with maps and plans of the district, if possible showing relief. This serves a double purpose. In the first place it is an opportunity for making a map real to the children, as they will be able to interpret it by constant reference to the actual features of the country. It should be noted here that if the rambles can be undertaken frequently to any one district, a rough map can easily be worked out by the teacher and pupils, determining direction by means of a compass and distance by means of pacing or the help of simple surveying apparatus. The second purpose of a map will be to serve as a means of recording facts of locality, and thus data of ecological[1] value may be collected. Directions must, naturally, be given previously to the excursion, as to the way in which the map should be used. Where the class is so large that individual supervision is impossible, the teacher will find it useful to supply the children with some simple form of guide-book, either hektographed by him or dictated to the children

[1] 'Ecology, 'the study of living beings at home.' *Haeckel.*

some time beforehand. The guide-books would contain, in addition to the map, general directions for the collecting and transport of specimens, special points of interest to which the children should direct their attention, a clear statement of some problems which are to be solved, some sketches of objects unknown to the children, which they would find and might not be able to identify, and some blank sheets for their own notes and sketches. This guide-book may become most valuable in supplying data for subsequent class-work.

Where excursions can be regularly and frequently undertaken, it is best to conduct them on the lines of regional survey—noting in succession facts of geological, meteorological, geographical, biological, and economic importance—recording these in charts and maps, starting with a bird's-eye view of the region from some elevated point, considering one aspect after another in analytic specialisation, mounting the hill-top again at the end and beholding the whole afresh.

(2) Intermediate Stage.

We have seen that the characteristic material of the science lessons at this stage consists of a series of problems which, especially at first, are related rather through their common connexion with such a subject as geography than by an internal principle of sequence. The characteristic method will accordingly be that appropriate to the solution of problems. There will be (1) the determination of the data of the problem, and (2) the search for means of obtaining 'intellectual control' over the data.

Determining Data.

The determination of the data involves, of course, the introduction and systematic use of quantitative methods. The metre rule, the balance, the burette, &c., become the habitual companions of our intellectual progress instead of being only occasionally invited to assist

us on our way, as was the case in the Nature-study period. But it is important to insist at once that quantitative determinations should not be introduced as if they were ends in themselves : they should be invoked only when they are necessary in order to deal with some clearly conceived problem. Thus there is very little to be said in favour of collecting statistics of barometric pressure unless in order to determine the connexion of barometric changes with the sequence of changes in the winds or some similar problem. Again, quantitative determinations should, as a rule, be made only where qualitative observations have preceded. This remark, which is valid throughout, applies with special force to the beginnings of chemistry, where there has been of late a tendency to introduce quantitative observations prematurely. Moreover, even when exact instruments are introduced they may with advantage at first be used qualitatively. For example, the balance may be used to determine *that* a thing has changed in weight, before it is used to determine the amount of change ; the burette may be used to deliver small quantities of liquid before it is used to measure them. In this way the difficulties involved in the mastery of delicate instruments are conquered separately. Finally, it is an obvious corollary of our principle that the measurement should not aim at an unnecessary degree of accuracy. For example, the vernier should not be used as long as the millimetre scale suffices.

The principle here laid down applies equally to non-quantitative manipulations, such as filtering, distilling, &c. These operations should not be taught for their own sake, but should always be ' invented ' as means to the solution of the problem in hand.

Precisely similar rules govern the use of the intellectual instruments which are brought to bear upon our problems. Our task can always be conceived as

the 'economical description' of the facts qualitatively observed or quantitatively determined. This economical

Intellectual Control of Data.

description is at times carried out by the invention of a terminology, at other times by the enunciation of a mathematical law: sometimes, again, both means are used. Thus, having discovered that a certain group of substances agree in the property of turning cabbage juice red, while the members of another group turn the same substance green, we may summarise our observations by the introduction of the terms 'acid' and 'alkali';[1] and a little later may invent the technical term 'neutralisation' to describe succinctly a common feature of the results we observe when acids and alkalis are mixed. The essential point in this, as in every case, is the introduction of new terminology *purely* as a means of securing intellectual control over established facts; never by way of reference to a systematic treatment of the facts which is not yet appropriate. Thus, having found that acids and alkalis taken in pairs yield characteristic 'salts,' we may well decide to name each salt from the acid and alkali that generate it. Common salt might then be called 'chloride of soda.' To call it 'sodium chloride' would be to anticipate results that can be established only at a later stage.

It is convenient to consider notes and diagrams among the 'intellectual instruments.' When simple

Note-books and Diagrams.

quantitative determinations—such as of density—are being made, the function of the note-book is plain. It is necessary only to insist that the work should be neatly and logically set down *at the time of the experiment* with

[1] Of course, we shall *never* assert that 'ammonia turns cabbage-juice green *because* it is an alkali.' It is *called* an alkali because it turns cabbage-juice green.

enough descriptive detail to render the record intelligible at a later date. Thus, it should always contain a clear statement of the aim of the exercise and of the result obtained. But in other cases it may be desirable to make the pupil write a report on an experiment so as to test his appreciation of the argument connected with it. In this case the 'rough notes' made at the time of the experiment should be expanded into a consecutive account intended to express the matter without omissions or irrelevancies for the benefit of a potential reader anxious to repeat the work or understand the conclusions. These notes—which are of course simply an exercise in a valuable form of English composition and should be considered from that point of view—will in many cases be illustrated by sketches of the disposition of apparatus. In distinction from the illustrations of the Nature-study stage these will be express *generalisations,* diagrams in which accidental features are ignored and only the essential elements retained.

Text-books.

It is obvious that at a stage which may be characterised as the phase of *discovery* as opposed to the later phase of the *organisation* of discoveries, the text-book containing an ordered account of the results of the investigations in progress is quite out of place. For this reason it has often been the custom to insist upon a more or less elaborate record of all important work, so that each pupil may gradually create a text-book for himself. This plan, admirable in conception, is subject to certain obvious practical inconveniences. To overcome these the distribution at convenient intervals of a printed summary of the experiments and theoretical discussions that have already taken place has been suggested.[1] The plan will without doubt solve the most important difficulties of the situation.

[1] See references for further reading below, s.v. Russell.

It will be convenient to give in broad outline one or two examples of the modes of treatment appropriate in this intermediate stage.

Procedure Illustrated.

In a class of average age about 11 years, we have been considering the winds and are seeking some explanation of their origin. We have got beyond the age at which mythical or semi-mythical accounts would satisfy us. We determine to examine the conditions of *draughts*, which reproduce the phenomena of winds on a manageable scale. We soon reach the conclusion that the heat of the fire causes the draught; that it makes the air rise in the chimney, to be replaced by colder air rushing towards the hearth. This discovery suggests that the air is made lighter by being heated. To decide the point, we fit up the customary flask and stem dipping into coloured water, and finding that the air occupies more space when heated, conclude that the part which remains in the same space must, as we supposed, weigh less. In the heating of air, then, we seem to have found a possible *vera causa* of winds—an hypothesis which we verify by reference to the monsoons and other seasonal winds that blow towards heated places on the earth.

During the ensuing week we collect observations on the direction and character of the wind from day to day. When we meet to compare our notes curious discrepancies come to light. Smith thinks that Friday's wind was the coldest of the week, Jones is sure that it was Thursday's. Yet we are all convinced that one of the two must 'really' have been the colder. Here we have for the first time come in sight of the notion of an *objective* state of coldness which our perceptions aim at, so to speak, but do not always reach. How are we to settle such differences as the one which has arisen between Smith and Jones? After some excogitation a bright spirit thinks of last week's experi-

ment. The size of the air enclosed in flask and stem must show the real *temper* (as Boyle called it) of the air, so that if (for example) the liquid returned to the same point on a second occasion we should feel sure that the air was *really* as warm as on the first occasion, though it did not *feel* so warm. We conclude by deciding to give this 'real' hotness or coldness of things the distinctive name of *temperature*, while we assign the name *thermometer* to our instrument for recording it.

The further progress of the argument need not be traced. Following historical steps in the main, we abandon the air thermometer for the more reliable and convenient liquid-in-glass instrument. We then *use* the thermometer, accepting the familiar Fahrenheit graduation marks at present as part of the nature of things without inquiry about the mode of their determination. Eventually we discover the constancy of temperature of freezing and boiling water, and get to see how these temperatures might be made use of to ensure comparability between the thermometers.

A second illustration may be given from the beginnings of chemistry. We are investigating the circumstances under which carbon dioxide finds its way into air. We have discovered that it is produced when certain things burn; and on causing this burning to take place in a limited portion of air we have found that the combustible—coal-gas, a candle, or a wooden match—is extinguished. Is this because the carbon dioxide puts the light out, or because the air is 'used up'? Repeating the experiment over lime water we find that in fact a certain portion of the air does disappear, and that the residue (which certainly contains no carbon dioxide) does not support burning. Under the guidance of Scheele we turn our attention to various other processes in which the air plays a great part—the rusting of nails, the 'setting' of turpentine, the

germination of seeds, the quick and also the slow burning of phosphorus, &c., and so collect a body of evidence to show that in all these cases about one-fifth [1] of the air disappears, sometimes with the production of carbon dioxide, sometimes without, but always leaving a residue which will not support burning. What we have probably already suspected is now clear: air is not a single thing, as we have taken it to be. We must think of it as containing two distinct portions: the one-fifth that disappears in these experiments, and the inert four-fifths that remain. It is of course 'economical' to distinguish them by the usual names 'oxygen' and 'nitrogen.' [2]

Having studied the formation of metallic oxides, we turn naturally to the question whether it is not possible to verify our theory of air by regaining the lost one-fifth which we have named oxygen. We foresee that if we could isolate it, it should have the property of supporting burning, probably with unusual vigour. Under the inspiration of the teacher we select the familiar red lead for our experiment. We have made the yellow 'dross' ourselves, and we have been told, if we have not ourselves seen, that when roasted in air this dross becomes much heavier and is converted into red lead. On strongly heating red lead we are not disappointed. A gas evidently fills the test-tube, a gas which makes a glowing splinter burst into flame. Finally we perform experiments with large quantities of oxygen supplied from a steel cylinder, the oxygen having been obtained from the air (we are told) by a process essentially the same as the one which we have ourselves employed.

[1] In some cases our numerical results are likely to be as poor as Scheele's.

[2] Or, better (as suggested by Mr. J. B. Russell), to revive the name 'azote.'

A third illustration may be taken from elementary mechanics. We have suspended a wooden beam from two spring balances and have loaded it with various weights. We have found that (allowing for the weight of the beam) the sum of the readings in the spring balances (P and Q) is always equal to the load, W. The question then arises as to the conditions that determine the apportionment of this sum between P and Q. Fixing our attention upon the readings of Q and placing W at various distances *a* from P, we eventually determine that

$$Q \times l = W \times a$$

where *l* is the distance from P to Q.

This result suggests the experiment of varying the load (W) *and* the distance *a* so as to produce constantly the same reading, Q. By this experiment we get to realise that the product $W \times a$ has a special significance of its own which must be distinguished from the mere weight of the load. We easily come to view it (in a popular way) as the 'turning effect' of the load, and give it the name *moment* or *torque*. Critically, we view it as a means of predicting the proportion of the load which will be found in a spring balance applied at a given point.

We next apply our result actually to predict the distribution of the load between the supports in a simple case; then in the case where the load consists of two or more weights hung from different points of the beam. In each case we verify our predictions by actual experiment.

Next we consider the possibility of predicting the position of the single point at which the whole load, in the last experiment, might be concentrated so as to produce the same readings as before in the spring balances. The solution is of course obtained with little difficulty and once more verified.

Finally we apply these results to reach a clear conception of the 'centre of gravity' of the beam itself or the point at which all the weight might be supposed to be concentrated so as to produce the same pull on each of its supports. At the same time the method of determining the position of the centre of gravity by the integration of moments is implicitly in our hands, ready for development at the proper moment.

(3) Final Stage.

The characteristic of the curriculum of the final stage lies in the fact that it represents the attempts that science has made to organise wide ranges of facts and generalisations founded upon them by the aid of hypotheses of the third class. It follows that the order of exposition will at this stage be in the main coincident with the 'logical order' in which the subject is developed in the good text-book—which must now become a recognised part of the means of instruction.

It would be scarcely profitable to lay down rules of method that will apply at this stage over the whole of a field the parts of which are so differently characterized by the strongly marked individuality of the sciences that occupy them. It may, however, be useful to indicate with great brevity the beginnings of the 'critical' treatment of a subject built up under the guidance of such an hypothesis as the notion 'current of electricity.'

We take our departure, not from the historically earlier 'electric charge,' but from the 'electric current' omnipresent in our own day. A current is said to be flowing along a wire when we can detect a new 'magnetic field' around it. Our statement that there is a current in the *wire* is, in fact, to be regarded as a 'transformed statement of the actual facts' that a magnetic needle placed at different points near it suffers deflection. By reversing the 'sense' of the wire the field

is also reversed. It is clear, therefore, that we must conceive the ' current ' as a polar phenomenon, ' flowing ' one way only along the wire. We fix the direction, which we agree to call ' the direction of the current,' by the conventional assumption of Ampère's Rule.

Since the magnetic field at the same point outside the wire varies under different circumstances, it is obviously legitimate to raise the question of *measuring* the current. We are guided here by the discovery that at points along the axis of a small coil the strength of the field falls off with the cube of the distance. Thus such a coil behaves like a magnet of a definite moment in the ' end-on ' position of Gauss. But this observation alone will not suffice to enable us to measure the current in the coil unambiguously. If, for example, the *same wire* is wound into several coils in series, it appears that the circumstances of the surrounding field are different in each case. We must discover, then, the precise conditions which determine the variations in the magnetic field from coil to coil. It is soon found that the strength of the field at a given point in the axis varies directly as the area of the coil and the number of turns of wire in it. Thus, if we take the actual moment of each of the coils in series, and divide it by the number of turns of wire in the coil and also by the area of the coil, the result will be the same in each case, and may be taken, therefore, as our measure of what we agree to speak of as ' the strength of the current in the wire.'

For further examples of appropriate methods too long to be described here, the reader may be referred to articles on the teaching of mechanics and the atomic theory mentioned in the bibliography below.

FOR FURTHER READING

Karl Pearson, *The Grammar of Science* (new edition). London, 1900.

Ernst Mach, *The Science of Mechanics* (second English edition). Pp. xix and 605. London, 1902.

Ernst Mach, *Popular Scientific Lectures* (third English edition). Pp. viii and 411. London, 1898.

Ernst Mach, *Principien der Wärmelehre*. 2 Aufl. Pp. xii and 484. 1900.

Henri Poincaré, *Science and Hypothesis* (trans.). Pp. xxvii and 244. London, 1905.

Höfler, Poske, and others, *Abhandlungen zur Didaktik und Philosophie der Naturwissenschaften*. Leipzig, 1900, &c.

Ostwald, *Vorlesungen über Naturphilosophie*. Pp. xiv and 457. Leipzig, 1902.

(The above works contain expositions of the 'critical theory' of science.)

Merz, *History of European Thought during the Nineteenth Century* (2 vols.). London, 1903-4.

(An invaluable commentary on the progress and significance of science.)

Official Report of the Natüre-Study Exhibition and Conferences. Pp. vi and 307. London, 1903.

Special Reports on Educational Subjects, vol. ii.; Reports on 'The Curriculum of a Girls' School' and 'The Heuristic Method.' London, 1898.

Reports of the British Association: 1900 (Perkin, on Chemistry); 1902 (Divers, on Chemistry).

Perry, *The Teaching of Elementary Mathematics*. London, 1906.

Ostwald's *Klassiker der Exakten Wissenschaften*. Leipzig, Engelmann.

(A very important series of annotated editions and translations of the most famous scientific memoirs.)

Hellmann's *Neudrucke von Schriften und Karten über Meteorologie und Erdmagnetismus.* Berlin, Ascher.

(Cheap facsimile reproductions of memoirs by Torricelli, Pascal, &c.)

Alembic Club Reprints. London, Simpkin, Marshall.

(Selections from important memoirs—chiefly chemical. In English.)

T. P. Nunn, 'On Teaching Dynamics in Schools,' *School World*, December 1904; 'On "Mass" and "Force,"' *School*, December 1905; 'On Teaching the Atomic Theory,' *School World*, February 1906.

'Idola Pulpitorum: Science,' *Journal of Education*, April 1907.

(These papers contain further developments of points of method mentioned in the text.)

J. B. Russell, *Notes on the Teaching of Elementary Chemistry.* London, John Murray, 1907.

SECTION VII

LATIN AND GREEK

Educational Function.

Latin and Greek find their place in the secondary school as the culmination of the language work. The foundation of this department is English: by the native language the faculty of expression is first trained and systematised, and the simple relations of syntax are made clear. Complete and careful work in English is not only necessary, but it means a great saving of time in teaching foreign languages: it saves the time which is now spent in correcting the pupils' English, and enables that time to be profitably spent in direct practice of the foreign tongue. Next, the first introduction to foreign languages is given through some language which is like enough to their own in structure to be within the power of young children: that is, through a modern language. Perhaps the modern speech ideally best suited for training would be Italian; but for general convenience French, or perhaps German, has been chosen. Any one of these languages contains more inflexions than English, yet is not so unlike English in structure as Latin or Greek, whilst their contents are very much akin to those of English. But when the first foreign language is so familiar that it can be understood and used accurately up to a given standard, the time has come for the severer discipline of the classics.

Latin and Greek are valuable for different reasons.

As historical studies, indeed, both help us to understand the present by the past; but as languages they touch different sides of our mind. Latin makes finally clear the elements of grammar, and the laws of syntax: its fixed and logical structure makes it a bracing and instructive discipline for the powers of the mind. No loose or blurred expression is possible in Latin: all must be exact, and any mistakes are instantly demonstrable beyond doubt. In this work, then, stress must be laid on the linguistic side, and formal composition must be part of the course. There is also a literary side, and among Latin authors are several of first-rate importance, which the educated man must know: Latin is moreover the key to nearly all the mediæval history of Europe, and the foundation of many of its languages. But it is the training of orderly and accurate expression of thought, impossible without sustained attention, which is our main object in studying Latin.

With Greek, the chief interest lies in the literature. Here we have the beginnings of all literary forms, and the perfection of most; and the Greek types, being less complex than the modern, are easier of apprehension. There is in the Greek also both a naturalness and freshness as of childhood, combined with a keen intelligence as of manhood, and a directness and simplicity of expression, which are wanting in all other literatures. These qualities are inseparable from the language, and cannot be translated: in a translation, indeed, the simplicity of expression disappears, and the naturalness of the thought often appears rather childish than childlike. The absence of dead metaphor or artificiality makes the Greek language a valuable help towards seeing the truth of things: much that in English is vague or obscure is in Greek simple and clear-cut. In the effort of reading or translation this

sincerity of spirit reacts on the student, who unconsciously absorbs something of the Greek passion to see things as they are. In the literature there is also a wealth of observation and knowledge of human nature which appeals to us at all ages : their inimitable stories in childhood, their poetry and history in manhood, their divine philosophy in old age. Here, then, our chief aim is to understand and to enjoy the literature.

But for both languages, and indeed for any language, the mere reading of books is not enough : there must also be a mastery of the languages which will enable us to use them. The most effective way to teach this is by oral practice, reinforced and checked by writing afterwards ; for the arguments which prove the need of oral practice in a modern language also apply to the ancient languages, that of practical utility excepted. By this means, although we do not make Greek composition a main object, we attain a great degree of facility in it by the way. In the early stages, free or original composition only will be practised; exceptionally an exercise in translation will be now and then taken, when a new and difficult construction has to be taught.

In the following pages, then, we shall assume that our teaching is based on the spoken word, reinforced by writing, the material being supplied by the teacher or from books.

1. Latin.

The 'reformed' methods here adopted owe something to the admirable work done in recent years by modern language teachers, and something to the efforts of German schoolmasters. In Germany 'reform' has been in progress for some thirty years, and has produced excellent results. But the movement is not a new ideal ; it is merely the restatement of an old one. The schoolmasters of the early Renaissance adopted it in all

essential points, and it can be traced back to Quintilian himself.[1]

That which immediately follows is an outline of a Latin course for boys who begin at the age of about twelve and leave off at about sixteen; one lesson a day is supposed to be given. Experience shows that boys trained on the plan here stated may begin Greek at fourteen, specialise in classics at fifteen or sixteen, and be ready to compete at nineteen for scholarships at the universities. The problem how such boys should be prepared is discussed later.

In secondary schools of the 'grammar' school type, some reform in method is absolutely necessary. The old ways have been tried and found wanting. They can only succeed when more time is devoted to classics than is now possible. If some remedy be not found there is but one alternative—classics must be given up. It is with this conviction that the present writer has treated the problem in the following pages.

The task of the classical master is not the same as that of his modern language colleague. The latter has accomplished his aim when the scholars are in possession of a new instrument of expression; but the classical master wishes to do more than this. He must train his pupils in the principles of language which are illustrated by Latin and Greek, with a view to developing their powers of logical analysis and synthesis; he must also increase their mastery of the mother-tongue, by comparing it with another which expresses thought in quite a different way. This must be constantly kept in mind when discussing method.

There is some confusion and uncertainty as to what is meant by the 'reformed' method, and it will be well

[1] See the writer's article on 'Plutarch, Quintilian, and the Early Humanists,' in the *Classical Review* for March 1907.

to state distinctly the sense in which the expression is used in the present section. It does not mean neglect of grammar It does not mean 'picking up' the classical languages. But it means that grammar is learnt, in the first instance, *pari passu* with the use of language, and that the pupil learns to understand and use Latin and Greek as spoken, as well as in written speech.

'Reformed' Method.

Opposition to reform arises both from within and also from without the ranks of classical teachers. Some of those who are at present engaged in teaching Latin and Greek hold that the current way is better, having been evolved from centuries of experience. This view obscures the facts. Present methods are survivals from an age when the healthier and saner ideals of the early Renaissance had been forgotten. The reformed method is the older, and has the sanctions of psychology and of common sense.

It is the conviction of the writer that it is hopeless to teach Latin to beginners who are ignorant of simple English grammar, or who cannot compose short but correct sentences in lucid English. Without making a fetish of grammar, it is yet possible to train boys so that they know the meaning of the parts of speech and of the functions of words and clauses in building up a sentence. The teacher who has a class without this equipment will find himself handicapped at every turn, and will probably be obliged to teach a minimum of English grammar before he can make any progress at all. Those who are interested in this question will find it discussed in the 'School World' for December 1906.

The first year of Latin is, perhaps, more decisive than any of the others in its effect upon the final result. This is so, not only because success in the later stages

must depend upon the strength of the foundation, but because, unless a pupil gain confidence by mastering the difficulties he meets with at first, he may take a dislike to the subject which will destroy altogether the educational value of his subsequent training. It is accordingly of very great importance to make sure that the beginner is in a fit state to begin Latin. Put briefly, the necessary degree of intellectual development which should have been reached by the beginner is as follows :

First Stage: Simple Sentence.

(1) The pupil should feel an interest in the Romans as a people. That is, he should know that modern civilisation is connected with Roman. This knowledge is the result of reading history.

Necessary Preliminaries.

(2) A knowledge of French and of elementary etymology should have shown that the Roman tongue is the basis of the Romance languages, and that its vocabulary has given us many of our words.

(3) The pupil should have a sound knowledge of the functions of words and sentences, derived from a study of English, and should also be aware, from his study of French, of the way in which some of these functions are expressed by inflexions.

What ought the pupil to learn in the first stage? It would be unwise to attempt to fix a rigid minimum, because this minimum might be exceeded in some cases with advantage, while in others only a portion of the work prescribed can be thoroughly mastered, and yet the pupil may not be debarred from proceeding to the second stage. A fair margin being allowed on either side, it seems reasonable to require that at the end of a year's teaching the pupil should be able to understand and compose, orally and in writing, simple sentences framed out of a limited vocabulary. Whether

such constructions as the ablative absolute and the simpler uses of the relative can be added to the scheme will depend upon the capacity of the class and the time devoted to Latin. But the subjunctive mood should be kept in reserve until considerable flexibility and power have been acquired in the use of the simpler elements of speech.

This is a very good foundation for any knowledge which may be built upon it. It implies that a considerable proportion of the accidence has been mastered; while the syntax will include the 'concords' and the easier uses of the cases, especially those which are concerned with the prepositions.

The Romans have not left us a beginners' book, and in the early stages of Latin teaching the material must be modern Latin, or easy passages from Roman writers considerably simplified. There are two principles which should govern the whole of the teaching in the first year:

(1) Abundance of material should be set before the learner. Rules without examples, or with few examples, are useless because unappreciated. There should be much learning by heart, and a considerabe number of sentences, dealing for the most part with the work of the class-room or the everyday life of the pupil, should be so familiar that the simple rules of concord become unconsciously impressed upon the mind.

(2) The early stage is the one in which oral work is most efficacious. This is so for many reasons. The young boy is more attracted by conversational methods than older pupils. The work is chiefly concerned with the mastery of simple modes of expression; no time is spent upon literary masterpieces. Oral work is rapid; and rapidity is very important in the early stages because it is essential to give a fairly broad

view of the subject as soon as possible. It must also be remembered that certain brain-centres are developed by the use of speech which are almost untouched when a language is learnt by means of the eye. To use the ear as well as the eye increases the pupil's chance of success.

Reformed Pronunciation.

The reformed pronunciation is to be preferred for the following reasons:

(1) It is more correct.

(2) It connects the pronunciation of Latin with that of French and other modern languages.

(3) It is more musical, and trains the pupil to pronounce those pure vowel-sounds which are so rare in English.

(4) It is practically phonetic, one letter or group of letters corresponding to one sound only. Oral work is thus greatly facilitated. Quantity, of course, is of prime importance.

The objection is sometimes brought that the reformed pronunciation is hard to acquire. This is a mistake. It is really easier than the English, except when the latter has been taught first. Then, of course, trouble and confusion arise, but everything works smoothly if the reformed pronunciation be taught from the beginning.

Books for beginners written on reformed lines are of two kinds, according as they take a continuous story or a series of exercises as the material with which to work. It should be noticed that a series of exercises does not necessarily mean a congeries of detached sentences. Short stories, dramatic dialogues, and conversations may well be included. What it does mean is that the writer of the book is not hampered in his work by considerations of plot. In other words, he has a far wider range of material. I am inclined to favour the second type of primer, but as it is obviously stimu-

lating to a boy to read an interesting story, a book containing one may well be used in revision, when the whole ground has been covered once.

First Lessons.

The first few lessons must of necessity vary according to the standard attained by the class. If, unfortunately, they know no grammar; if they cannot distinguish subject from object, or understand what a declension means, two courses are open. The teacher may proceed to supply the information lacking; in other words, he may turn the Latin lesson into an English lesson. The meaning of 'declension' may easily be understood from the few instances of it which occur in English—*he, him, his*; *who, whom, whose*. On the other hand, a possible way out of the difficulty is to pronounce distinctly and write on the blackboard, with translation, several Latin sentences involving, say, the uses of the nominative and accusative as subject and object:

mensa est magna
video mensam

and so on.

The teacher may by the latter method succeed in time in forming a grammatical 'conscience' in his pupils. If he can do so, all the better. But experience tends to show that the mother-tongue is the proper medium to convey to the beginner those elemental principles of speech which are part and parcel of all languages, and I frankly confess that I much prefer the former method.

Whichever plan be adopted, it will be necessary, by means of much oral work and some writing, to impress the rules of concord firmly upon the pupil's mind. Oral work is better for practice than written, because there is less chance of mistakes becoming stereotyped by being written: *Littera scripta manet* is a true

proverb. But the lesson once learnt, writing must be used to fix it.

One or two points of detail remain to be discussed. In the first place, as soon as one declension has been mastered the others should be learnt as quickly as possible. The difference between them is one of form, and not of meaning. When once the meaning of 'declension' is understood, the rest is mere memory-work. Similarly, the tenses of the four conjugations—or rather five, since the *facio* class is of great importance and should be learnt at once—may very properly be taken together. The difference between *recitamus, sedemus, claudimus, aperimus,* is merely that the characteristic vowel is different. Boys pick up very readily the fact that *o, s, t, mus, tis, nt,* perform the function of the English personal pronouns *I, you, he,* &c., and a knowledge of this fact will help them considerably while they are learning the various tenses.

The ordinary work of the class-room may be described in rough Latin equivalents, and sentences of a simple type should be used to convey the ordinary commands and questions which are constantly occurring. *E.g.*:

Master : *claudite libros.*	Boys : *claudimus libros.*
Master : *noli sedere.*	Boy : *non sedeo.*
Master : *surge.*	Boy : *surgo.*

In all oral work the pronunciation of the boys, and *à fortiori* that of the master, should be pure and true to quantity, and above all fluent and distinct. Incalculable harm is caused by muttered or hesitating answers. A lazy habit is formed; the boys are habituated to vague impressions; and the work of the class is inaudible to a large part of it. But the most vital reason is, that clear speaking conduces to clear thinking.

Writing may with advantage be reduced to a minimum. As has already been pointed out, it is unwise to stereotype mistakes. But since writing cultivates special brain-centres, it should not be abandoned altogether. A good plan is to do orally all the work which is afterwards done in writing. The advantages of both methods are secured by this plan.

Little Writing.

To many people the reformed method of teaching languages is equivalent to neglect of grammar. To prevent any misapprehension, let it be clearly stated that the grammar must be learnt, and learnt thoroughly. The reformers are insisting upon two principles which have been somewhat neglected in the past :

(1) Grammar must be learnt *pari passu* with the actual use of the language. No paradigm should be learnt until its meaning and use are understood.

(2) Unimportant exceptions, such as the gender of *virus* and the genitive of *supellex*, may well be left until the need for them arises.

Most boys have very hazy ideas of the manner of life the Romans used to lead, and it is a good plan to make them familiar with Roman *Realien* by means of pictures and models. As pictures distract the attention when they are set in the 'reader,' it is better to use them as material for composition lessons, or for learning vocabulary. For example, a picture of a Roman citizen will not only make it clear that the *toga* was not like a modern gown, but may be used to aid the class in constructing simple sentences such as : *Toga corpus tegit ; sed dextra nuda est ; toga terram non attingit* ; if the class be shown models or pictures of Roman soldiers, and then be told, with translation if necessary, *Ibi gladius est ; miles gladium habet ; mucro gladii acutus est*, and so on, the boy will after a while be prepared to

Pictures.

learn the paradigm and the names of the cases that compose it.

At first, perhaps, it is as well to confine one's attention to such ideas as the Romans possessed in common with ourselves. The Romans walked, ran, ate, and slept as we do; and such general ideas will furnish enough material to occupy the teacher for the first few lessons.

Translation.

Translation, both from and into Latin, cannot be avoided in the early stages; it is often needed for explanation, but it is not cultivated for its own sake. However much time be devoted to Latin, it will not be enough to supply the learner with sufficient material to enable his power of unconscious generalisation to work. But translation, however ably taught, does not create that instinct for language (as the Germans call it) which it is desirable to produce in the pupil's mind. This instinct is best fostered by means of question and answer in Latin on the lesson of the day. Suppose in that lesson the following sentence has occurred:

mane pueri ludum intrant.

The following questions and answers might ensue:

qui ludum intrant?	*pueri ludum intrant.*
quid intrant pueri?	*ludum intrant pueri.*
quando pueri intrant ludum?	*mane intrant ludum pueri.*
quid faciunt pueri?	*intrant ludum pueri.*

Such exercises, besides doing much to create that instinct for the language which I have mentioned, also show the importance of the order of words. It will be seen that the word which really answers the question comes first, and the rest of the answer does not differ (except in the order of words) from the part of the

question which is left when the question-word has been taken away.

Another excellent exercise is a kind of 'missing word competition.' A sentence is given wanting one important word, *e.g.* an adjective or verb, and the pupil has to make the appropriate addition.

habemus —— matrem.
Romani contra hostes fortiter ——

Such exercises not only help to create the 'language feeling' (for of course the whole sentence and not the missing word merely, should be given by the pupil), but also present one kind of difficulty at a time instead of several.

Vocabulary.

The question of vocabulary is one which presents some difficulty. Although the memory of young boys is good, it is nevertheless undesirable to employ so many words that they cannot be learnt perfectly. Further, the words that are learnt first should be those most commonly employed by the classical authors whose works will be studied in the next stages. Perhaps 1000 is the number which ought to be known by the end of the first year. A proposal has recently been made by Professor E. V. Arnold, of Bangor, that schools should come to some agreement as to vocabulary, assigning certain words to the first year, certain others to the second, and so on. It would be convenient for examiners in public examinations to know exactly what words the candidate is supposed to know, and the adoption of the plan would also enable boys to move from one school to another with a minimum of disturbance in their studies. But obviously much more organisation of our secondary schools will be necessary before the plan becomes possible.

In conclusion, the necessity of thoroughness should

always be present in the teacher's mind. Let him take care that:

(*a*) The declensions and conjugations be thoroughly known.

(*b*) The boys can use them with accuracy and fair speed.

(*c*) Special attention be paid to the usual 'traps, *i.e.* the difference between 'by' expressing the agent, and 'by' expressing the instrument; 'to' the sign of the indirect object, and 'to' denoting 'motion to.'

(*d*) The gender and genitive of every noun be learnt thoroughly as it occurs.

(*e*) Similar attention be paid to adjectives.

(*f*) Pronunciation be accurate, fluent, clear, and enunciation spirited.

(*g*) The importance of the order of words be insisted upon from the first.

(*h*) A considerable quantity of simple Latin be thoroughly understood and then committed to memory.

Finally, the great secret of success is constant repetition.

Second Stage: Complex Sentence.

A boy is ready for the second stage when he can understand and compose, with accuracy and ease, simple sentences involving the ordinary inflexions, excluding those of the subjunctive. He has now to master the complex sentence and to make more complete his knowledge of accidence, so that he may begin in earnest to read the easier Latin authors in the third stage.

The general principles of stage i. hold good of stage ii.

(1) A considerable part of the work should be oral.

(2) The rules of grammar should be impressed upon the mind in the first instance, not by the use of

a systematic grammar, but by a careful examination of Latin passages illustrating these rules.

(3) Nevertheless, a systematic grammar, containing accidence and syntax, should be used in this stage so that the rules already learnt may be learnt by heart in a logical order.

On the other hand, increased attention will be paid to translation and written free *composition* (not translation), because the object in view is to prepare boys for the period when they will be studying the classical authors and learning to write Latin prose.

Procedure.

At the period we are discussing, all the teaching should be based upon, and spring naturally out of, the 'reader.' Occasionally, once a week perhaps, there should be a definite grammar lesson dealing with a particular point, and a definite composition lesson, consisting sometimes of free composition and more rarely of translation. The remaining lessons should be concerned with the study of simple Latin, from which should be derived material for a little composition and a little grammar-learning. These lessons, in fact, will be divided into three distinct parts : (1) translation ; (2) grammar ; (3) composition.

There will now be given a fuller consideration of these three types of lesson, the 'mixed' lesson, the grammar lesson, and the composition lesson.

The 'Reader.'

For the 'mixed' lesson the chief requisite is a text. Fortunately, the simpler poems of Catullus and Martial, and the stories found in Livy and other Latin writers, form admirable material. The poems can be used without alteration, or with the omission of a few lines ; the prose needs simplification and, to a certain extent, to be re-written. The 'reader' at first should be too easy rather than too hard. It does not matter much in what order the syntactical constructions occur in the 'reader,' for the

teacher can always pick and choose the particular point upon which he is going to lay stress, passing over the others with just as much comment as makes them intelligible. Moreover, if the 'reader' consists of short stories, a passage can be easily chosen which illustrates best the point to be explained.

The 'reader' should be interleaved with blank pages. On these may be written such notes as the teacher thinks fit to give, either before the lesson or during it. They may also be used for inserting references to the sections of the grammar.

Each boy ought to possess a small dictionary; to learn how to use books of reference is an essential part of education. Boys are slow at finding out words in a small vocabulary; they are slower still in learning to use a dictionary. But speed comes with practice, and it is obviously useful that the way to handle books of reference be mastered at the first opportunity,[1] to say nothing of the gain derived from studying the history of words and their various meanings.

Dictionary.

At first the teacher will find it necessary to explain each lesson fully in class. He must give the unknown words, which may be entered on the blank page, explain the new constructions, and show the class, by precept and example, how to translate. At this period home-work will consist of learning what has already been explained, or of written composition based upon the day's work. But in course of time the boys must be encouraged to make use of their own initiative. Whenever a story or passage occurs containing no difficulties which have not been mastered, it should be prepared with the sole help of grammar and dictionary.

[1] Some boys are inordinately long in finding a word in a dictionary or vocabulary. I have known one who was a minute and a half in finding *hora* in a vocabulary of ten pages. But skill comes with practice.

During the second stage much of the ordinary class-room conversation can be carried on in Latin. If a boy mutters an answer instead of speaking out, the master can check him with *nescio quid dicas*, and in this way familiarise the mind of every pupil with instances of common constructions. Question after question should be asked upon the subject-matter of the portion of the 'reader' that is being studied. It will be found that nearly every sentence admits of two or three questions, the answer to which will be subject, principal verb, object, or subordinate clause.

Colloquy.

When the translation is known, the grammar learnt, and the questions answered, a little composition should be given. This may consist of single sentences illustrating the particular point or points which have been just explained.

The special grammar lesson will take place once a week. When a new construction has occurred several times, and the boys have collected a number of instances from the 'reader,' it should be fully discussed and mastered. The point must be finally driven home by its appearing prominently in the sentences set for translation from English into Latin. Even then, constant revision will be necessary if the ground gained is not to be lost.

Grammar.

A word of warning is necessary. If grammar be learnt from the 'reader,' it must be made clear that one instance does not justify the formulation of a syntactical rule. It should be explained that grammar 'rules' are not laws, but merely habits of speech; that the sentence under examination is an example of such a habit; and that other examples will be met by and by.

When a story, or a poem, has been thoroughly mastered, it should be learnt by heart. But the Latin

must have been so well studied that this final process involves but little labour. It is all a matter of habit and training. If a boy knows that the piece he is working at is going to be learnt by heart as home-work later on, he will be gradually assimilating it all the time.

Besides composition of short sentences orally during the construing lesson, there should also be some definite

Composition.

composition lesson in the second stage. The work should be of two kinds. In the first place many sentences, or short stories, based upon the 'reader' and involving constructions recently learnt, may be dictated by the teacher for translation into Latin. It will be as well, in order to avoid fixing blunders in the mind, to have these translated orally before they are translated on paper. Secondly, free composition from models or pictures will be found extremely useful. Ordinary illustrations will often suffice, but they may be specially prepared for the purpose. Series of pictures, representing the chief moments of a story, have been successfully used in modern-language teaching, and there is no reason why they should not be equally serviceable to the classical master. Under careful guidance a class may learn, by working with their teacher, the laws they must obey in writing a piece of composition.

The following are short descriptions of a series of six pictures used by the writer for this purpose :—

I. Sextus Tarquinius being flogged.
II. The people of Gabii welcome him.
III. Sextus sends a messenger to his father.
IV. Tarquinius Superbus strikes off the tallest poppy heads.
V. The chief men of Gabii are led away to death or exile.
VI. The Romans enter and take possession of the city.

Now it is obvious that the pictures in this case cannot give the whole of the story. No one can tell, unless he is familiar with the legend, that the man in IV., striking down the poppies, is the Roman king, and father of the man in I. who is receiving the flogging. So at some point or other in the lesson the teacher must impart such information as is absolutely necessary.

If the class consists of boys in their second or third year of Latin, the lesson takes somewhat the following form. The class looks at the first picture, and then the master asks about whom they are going to talk. Answer: *Sextus Tarquinius.* Teacher: 'What are you going to say about him?' The question may be asked in Latin if it be thought advisable. Answer: *Verbera patitur.* Teacher: *Cur verbera patitur?* Answer: *Ut Gabinos fallat.* It may happen that a boy will suggest the addition of *sua sponte* or *iussu patris*, or even the prefixing of *Cum Romani Gabios vi expugnare non possint.* Perhaps no boy is ready with an answer, or the answer given is imperfect. The teacher must then suggest an answer, or bring about the amendment of the faulty one. He must pay attention to the order of words, and show how the order of words is, roughly speaking, the order of thought. Plenty of scope is thus given to his ingenuity and power of stimulating interest. When the first picture is finished, the final description is written on the blackboard, thus:

Cum Romani Gabios vi expugnare non possint, Sextus Tarquinius, filius Superbi, sua sponte verbera patitur ut Gabinos fallat.

Picture II

T. About whom are we going to talk?
A. *De Gabinis* (teacher suggests *illis*).
T. *Quid faciunt Gabini?*
A. *Sextum excipiunt Gabini* (teacher suggests *eum*).

T. *Quando excipiunt?*
A. *Vulneribus visis excipiunt.*
T. *Quomodo?*
A. *Laeti excipiunt.*

In this way the second sentence is composed; *Illi vulneribus visis eum laeti excipiunt*: it must then be repeated. And the story might go on: *Tandem imperio summo potitus Sextus epistulam ad patrem mittit ut discat quid sit faciendum. Ille veritus ne infidus sit nuntius nihil voce respondet, sed in hortum progressus summa capita papaverum baculo decutit. Quibus renuntiatis Sextus ubi intellegit quid pater velit primores aut occidit aut expellit. Deinde rebus occisorum populo divisis placet ut Romani Gabiis potiantur.*

The whole story is then copied from the board by each boy into an exercise-book kept for the purpose. As each boy has a copy of the pictures, and, so to speak, sees the events taking place before his eyes, it is natural to have the story told in the present tense, as above. Afterwards (*e.g.* as home-work), it can be written out in the past tense. This will involve attention to sequence of tenses, to the difference between perfect and imperfect, and so on. Other variations are possible. Sextus may tell the story, or Tarquin the Proud, or the people of Gabii. Later on, more advanced pupils may compose original themes without help, but at first these must be avoided: if allowed a free hand young boys will simply evade difficulties.

The chief value of such a lesson as the one outlined above is its elasticity, and the consequent possibilities of hearty co-operation between teacher and class. By working with his pupils, the teacher shows them how they ought to work by themselves. At the same time he is prepared to welcome any suggestion and turn it to the best advantage. The 'average boy,' who

often sinks into listless apathy after a few terms at translation exercises he does not quite understand, is roused to action when he sees his teacher working with him and leading him to the achievement of something artistic. And all the while the connexion between words and ideas is kept alive by the use of visual impressions, instead of words, to suggest the ideas to be clothed in a Latin dress, an excellent antidote for the mechanical, word-for-word operation into which translation is apt to degenerate. There is no opportunity for the learner to mistake what he has to express in Latin. In a picture all is clear-cut and precise. Moreover, that fascination of the attention exercised by an illustration, a serious drawback during a construing lesson, is a positive virtue when the details of the illustration form the subject which the pupils have to turn into Latin.

Finally, as in the first stage, so in the second, great stress should be laid upon accurate and distinct pronunciation, upon the thorough mastery of rules, and upon accurate order and neatness in written composition.

Third Stage: Author, &c.

At the end of the second stage the pupil should have mastered the accidence, with the exception, perhaps, of a few irregularities, and the main outlines of the syntax of complex sentences. He has now before him a threefold task :

(1) To acquire readiness in understanding and in translating the ordinary Latin authors.

(2) To learn to write simple, idiomatic Latin prose, both in ' free ' composition and in translation.

(3) To master the structure of the simpler metres.

In this stage there will be, perhaps, less oral work than in the previous stages. The amount will vary according to the degree in which feeling for the language

has been acquired. If a fair amount of success has been achieved, more time may be devoted to translation and composition, and to the obvious points of style and scholarship.

Three kinds of lessons may be distinguished in this part of the course :—

(1) The construing lesson ;
(2) The composition lesson ;
(3) The 'unseen' lesson.

Construing.

There should be at least three construing lessons a week. One or two periods should be spent on composition, and one on an 'unseen' taken out of the author that is being read. The text used should have all the long vowels marked, should not be illustrated, and should contain no notes or vocabulary. Illustrations distract the attention : the 'reader' is not the place for them. Notes are worse than useless in the hands of most boys, for to use notes properly is an art which they have not yet acquired. Vocabularies lend themselves to dishonest uses and are productive of lazy habits.

Should the teacher feel that this is to expect too much from his class, he may give them notes himself before the lesson is attempted. Boys ought to be practised in the art of taking down notes. At first all notes must be dictated, but in course of time the power will come of taking down in brief the substance of the teacher's remarks.

In translation, idiom and accuracy should receive careful attention. Slovenly English is intolerable, and the custom of allowing so-called 'literal' translations to pass muster has been responsible for much of the ill-odour into which classical study has fallen. On the other hand, accuracy is of prime importance.

Every boy must be able to account for every word that he is translating, if called upon to do so.

Some part of every translation lesson must be set aside for grammar. Within the range of his reading the genitive and gender of every noun, the parts of every verb, the reason for every instance of the subjunctive mood, should be known thoroughly by every boy. This is all the more necessary because in the third stage no period is set apart for a special grammar lesson. The outlines of grammar, in so far as they are necessary for actual usage, are supposed to be known already; the task remains of filling up gaps and of revising work already learnt. The scientific study of grammar, on historical or philological lines, will be followed in special lessons at subsequent stages by such boys as intend to take up Classics at the university.

Composition.

Each lesson will naturally allow of practice in composition. Questions may be asked in Latin, to be answered in Latin. These are of two kinds:

(*a*) Questions the answers to which are taken directly from the text.

(*b*) The questions on subject-matter, which imply some skill in free composition.

In addition to these questions, sentences may be given for translation in writing, or the substance of the passage just read may be written out in Latin.

Learning by heart of suitable passages which have already been mastered is a valuable help, and should be continued in the third stage. It has been found by experiment that in course of time the close study of a passage which takes place during the translation lesson causes most boys to learn it almost unconsciously by heart.

If due attention has been paid to quantity during

the preceding stages, there should be no difficulty in teaching the structure of simple verse. The difference between long vowels and long syllables will now present no difficulty. A little very simple verse-composition may be attempted in the case of such boys as show literary ability.

While the 'reader' is being laboriously studied in the manner suggested above, it will be found a good plan to read rapidly some very easy author. This may take the place of 'unseens.' The recently republished translation of 'Robinson Crusoe' will afford excellent material.

The composition of the third stage may begin with either detached sentences or very simple stories. As it is certainly desirable to base as much composition as possible upon the 'reader,' the teacher must compose these sentences himself. Afterwards one of the many books of simple passages for translation can be used. It is as well, however, to have the earlier part of the course translated orally before being committed to writing. In this way fewer mistakes will become stereotyped by being committed to writing.

A little picture-composition may perhaps prove a welcome change from translation, but the following plan generally proves more profitable during the third stage: The teacher reads or gives a short account in Latin of a fable or some incident well known to the class, say an event which is occupying the newspapers at the time. He then makes them write on the board such words as he thinks the boys will not know. Then he reads the whole story once more, rather more slowly than on the previous occasion. Finally the boys are told to write out in their own words as much of the Latin as they remember. Any teacher who takes pains over this method will be abundantly repaid, but he must be on his guard against the boys' writing

nonsense or introducing too many variations of their own. Experience proves that few boys are capable of such variations, at least for some time.

'Unseens.'

The chief difficulty felt by a young boy in setting about an 'unseen' is (should the vocabulary be within his powers) to discover the main drift of the piece before him. His mind must be in such a state that he can 'apperceive' correctly both each separate sentence and the whole. For this reason 'unseens' must not be too hard: it is better to err on the side of simplicity, and to choose the 'unseen' from the author in hand. At first it may be well to give the class a general idea of the piece to be translated, but all such 'crutches' must be dropped at the earliest opportunity. Slipshod writing must be severely penalised, and an effort made to combine a literal translation with crisp, nervous English. In correcting 'unseens' the teacher will do well to insist, not so much upon the errors made, as upon the correct translation. It is always a good rule to 'forget those things which are behind' and to press forward to that which is better.

2. First Two Years of Greek: Age for Beginning.

According to the plan sketched above, Greek will be begun in the fourth form, with an average age of 14 or 14½. By this time, both French and elementary Latin will be familiar, and the learner's energies may be concentrated on his new work. For the first few weeks, intensive study is of great advantage; the learner's natural curiosity in a new language, one moreover which has a new alphabet (and this excites great interest at first) may be used by giving some time over and above the daily lesson; the extra time may come from Latin or English. Thus the necessary drudgery would be reduced. The general rules of accent (which are quite simple) may also be

taught in these early weeks; it is found that these also excite some interest.

It is desirable to use the reformed pronunciation, which brings Greek into its proper connection with Latin.

Pronunciation.

This pronunciation chiefly affects the vowels. Strictly speaking, the aspirates should be pronounced as aspirated mutes ($k+h$, $t+h$, $p+h$), not as fricatives (*ch*, *th*, *f*), but practical convenience may be allowed to rule here without much loss. The case for this change is stated in a pamphlet published by the Classical Association, and need not be argued here. It is also recommended that the accents be pronounced by a raising of the tone. This is quite easy for a large number of Greek words, and it is possible for most with reasonable care, for all with sufficient care and practice. Even circumflex and acute may be distinguished; but if they are confused, the accented syllable at least may be marked. Such practice cannot be despised as useless; for anything which helps English boys to command their vocal organs and make them flexible is a very great gain; nor is it too difficult, for I am assuming that the organs will already have been well trained by their practice in French and Latin.

The general method here also will be based on oral work, reinforced by writing; and although paradigms

Method.

must be learnt, we must on no account learn through a formal grammar before beginning to speak, read, or write. It is true that there will be no need now to explain the meanings of declension and conjugation, which have been learnt already through Latin; full paradigms of a noun or a tense may be set almost from the first, and the learning of them must be a regular part of the work. Yet the work should be based, as before, on speech, and the complete sentence as before should

form the unit. Even the alphabet may be learnt in this way, thanks to the foresight of the poet Kallias, who put it into iambic verse ('Athenaeus,' p. 454); he also shows us how we may learn the values of the letters by spelling aloud, as a Greek boy used to do in school,

βῆτα	ἄλφα	βα
βῆτα	εἶ	βε
βῆτα	ἦτα	βη
βῆτα	ἰῶτα	βι
βῆτα	οὖ	βο
βῆτα	ὦ	βω

and so forth. By this means we make the language a real medium of expression from the first; and we continue to do so by introducing as soon as possible conversation in simple sentences on the acts and things of everyday life. The method in fact is the same as for Latin, but the pace is quicker.

I have in the last paragraph left aside a debatable point: what should be the dialect first to be learnt?

Attic or Homeric?

Our object in learning Greek is to understand and enjoy its literature; and the chief part of its literature is Attic; on the other hand, the books best suited for the beginner in subject-matter are Homer and Herodotus. Hence there are some who maintain that the Homeric dialect ought to be first learnt, and that Homer should be the first text-book. But the complexity of Homeric forms, not to mention his huge vocabulary, seems to me a conclusive argument against beginning with Homer. Attic, moreover, is the finest conversational dialect of all known languages, and if we are to make our oral work simple and natural, Attic must be our choice. It is also found that if Attic be learnt, Homer can be understood without great difficulty; but

it must be admitted that, whichever we choose, there will be in the early years some confusion and a number of mistakes in accidence, which might be avoided if we could keep to one or the other.

Taking Attic then as our standard, we must have a first Greek book specially prepared. This book may be of two kinds: either a continuous narrative composed to illustrate the grammar, or a series of shorter pieces composed or chosen for the same purpose. Both must contain the necessary grammar in full. The former is exemplified in the 'Greek War of Independence,' by C. D. Chambers (Swan Sonnenschein), which is composed in the vocabulary and style of Thucydides; an admirable book in nearly every respect. A book of the latter type should contain many easy stories or extracts, passages for learning by heart (in poetry therefore by preference), specimen conversations, and the grammar. New points of syntax should be introduced gradually, and some means must be found to repeat the same words often, with their cognates (*e.g.* ὁ ἀροτὴρ ἀροῖ τὴν γῆν ἀρότρῳ, &c.). Where extracts from Greek books are chosen, this repetition may be got by conversation. It is necessary, however, to avoid all such books as arrange the exercises according to the system of a formal accidence. The order should be a natural order; that is, the learner should acquire the language as far as possible as he learnt his own—common forms and constructions first, not the first declension first. Thus the article and part of the verb 'to be' must come at the very beginning; and we must give without delay a general view of declensions and the commoner parts of the conjugations. The task of learning is much easier than might be supposed, since there are so many points of resemblance between Greek and Latin. Thus

The First Greek Book.

the adjective δῆλος, δήλη, δῆλον, is so like to *bonus, bona, bonum,* that when it has once been heard it may almost be taken as known; so also with accusative and infinitive, future participles for expressing purpose, the absolute case, and many other idioms.

The 'Reader.'

A 'reader' may also be useful along with the 'First Book.' It is possible to find a good many short poems, such as those attributed to Anacreon, or some out of the 'Anthology,' which are simple and suitable to be learnt: whilst for the prose portions, although there are few complete pieces which are quite suitable, many episodes may be found which are so. Such are anecdotes from Herodotus, stories from Aelian or Pausanias, episodes from the Greek novelists, tales of real life from the Orators, and the fragments of the New Comedy.

The First Author.

From one term to a term and a half is enough to learn the whole of the common accidence and the chief rules of syntax: and now it is time to begin an author, revising the grammar with special reference to the author as he is read. Very slight omissions would make Lucian's 'Dialogues of the Dead' and his 'Dialogues of the Gods' an admirable first author; part of his 'True History' is also suitable. After this, one of Plato's easier dialogues may be read, such as the 'Ion,' or even the 'Apology'; a private speech of Demosthenes, such as 'Conon,' 'Callicles,' or 'Zenothemis'; Lysias, some of the shorter pamphlets of Xenophon, simplified Thucydides, Atticised Herodotus: there is a good choice at this stage. It is very necessary, however, not to burden the learner with long notes or introductions. All the books named above are interesting even without a knowledge of all the allusions: and the master will find it best to give what help is necessary himself. We

very much need a series of texts for this stage, accompanied by a very few notes to give the minimum of necessary help.

We have to consider now two classes of boys : those who intend to make a more thorough study of Greek, whether as part of a liberal education without other motives, or as a step towards the university; and those who either leave school at sixteen, or at least who may think it necessary to begin some special study of another kind. For the latter class, the choice of work is now all-important; because they must gain in this year something which should be of permanent value to their intellectual growth. They have already worked through all the grammar which is necessary, but of course they will not know it perfectly; it will need revision, and some part of each lesson should be given to revising it. The grammar work should be based on the reading, but it is also desirable to set parts of the formal grammar-book to be looked through in order to refresh their memories. This, however, is a strictly subordinate part of their work, the main object of which is to gain some knowledge of the masterpieces of Greek literature.

Second Year.

To this end, at least one of the most characteristic works should be read, and some means should be taken to give the pupils a general idea of the whole. For one term at least, perhaps more, the text-book should be Homer. If the class prepare twenty to thirty lines, these may be translated and questions given on the grammar, the memory of Attic being kept fresh by asking the Attic equivalents of Homeric forms. This done, the class may read out the passages following the lesson, the master questioning them in Greek, asking for a paraphrase or an explanation : much of the author will be understood in this way without translation, but translation may be used

Homer.

sometimes and ought to be used when there is difficulty or new words occur. Two or three books may thus be read in a term, and the rest of the Homeric story either told, or read in extracts.[1] After this, a sketch of Greek literature may be given in simple form by the master, and specimens may be read from Herodotus, Plato, Thucydides, Xenophon, and others. If possible, a tragedy should also be read: the 'Prometheus' or the 'Persae' is suitable, and perhaps the 'Plutus' or the 'Clouds' in abridged editions. Finally, specimens of the other departments of Greek literature should be given, especially such as show the range of Greek thought. Thus one lesson may be devoted to reproducing a proposition of Euclid in Greek, the boys being asked to do it afterwards and finally to write it down. If the new words be written upon the board, this is a task well within the powers of an average class; and such things will help to bring home to them how vast is the debt which our intellectual life owes to Greece. With the same object, pieces of Greek science or medicine may be read; the medical writers in particular have preserved for us precious pictures of the daily life of the Greeks. The life of the countryman is also vividly pourtrayed in Dion Chrysostom's 'Hunter.'[2] It is not desirable to lay down a definite scheme of reading here: the scope is too wide, and the master should choose those pieces which please him. In Wilamowitz-Möllendorff's 'Lesebuch,' he will find guidance, if he wants it; and a

Other Reading.

[1] A useful help for reading in extracts is *Florilegium Tironis Graecum* (Burrows and Walters); but I much prefer a complete text, the master choosing his own passages.

[2] Wilamowitz-Möllendorff, *Griechisches Lesebuch*, Weidemann, Berlin; republished in Marchant's *Greek Reader*, vol. i. (Clarendon Press.)

suggestive essay having the same object may be found in the 'Classical Review' for February 1907.

Whilst the attention of the class is thus bent on the subject-matter of their reading, there is no need to neglect composition. It is true that the class have as yet neither the knowledge nor the skill necessary for translating passages of idiomatic English into idiomatic Greek; all they can do in that way is to render simple sentences that illustrate important points of syntax (such as that of the conditional sentence) by means of familiar words. But they have been accustomed all along to express familiar thoughts in their own way in Greek, without translation, and this may now be carried a step further with great profit. Having read the first scene of the 'Iliad,' for example, they may write the story in Attic prose; and original compositions may be set periodically on current events, or on imaginary situations. Let us take an example or two. There has been a general election, say; the master may give up a lesson to describing, in Greek, the constitution of Parliament, causing all new words to be written upon the board, and making the class repeat, singly or in chorus, whatever he says; or he may put questions upon what he says so as to cause the answers to repeat the statements in a different way. The written exercise may now be either a repetition of the account in similar form, or the election described by one of the candidates, or by an ancient Greek restored to life, or as the teacher's fancy or the boys' fancy may suggest. Similarly, the Chicago packing scandals may be described, or a West Ham guardian may defend himself in a speech before the judge, or a battle of some current war may be described by a combatant. Mythology may also be used, after the fashion of Lucian. Suppose there has been a spell

Composition.

of bad weather; let the Prime Minister and the President of the Board of Trade climb Mount Olympus and complain to Zeus of the iniquities of Boreas. Such themes as these always call out keen interest, and often reveal unsuspected gleams of imagination. It is perhaps not unimportant that the correction of the exercises becomes in this way a pleasure to the master, not a bore. In fact, the mechanical part of his work is reduced to a minimum, and the influence of the Greek spirit, with its bright fancy and its keen curiosity, is strong upon the young minds. In nearly all children there is a rich store of imagination and fancy, which under our present system are soon deadened; we hope by the means which I suggest to keep them alive.

Thus the boy who drops Greek at sixteen has not spent his time in vain. He has not yet learnt, it is true, to translate pieces of English into a perfect imitation of the style of Sophocles or Demosthenes, nor has he learnt by heart all the information in some annotated edition of a Greek author. On the other hand, he has been introduced to two or three of the masters of literature, and has read several of their works complete, and with enjoyment; he has also got some idea, if vague, of the vast range of Greek intellectual achievement. He has, moreover, taken in something of the Greek spirit, and realised its directness, its simplicity, its passion for truth and beauty; whilst his own imagination has been helped rather than hindered by his work. We have sown seeds of thought in him which will not all fall on barren ground; but some of them, at least, we may expect afterwards to bear fruit.

After the four years' course of Latin, and the two years' course of Greek, the time of specialising must begin. In the Fifth Form a little extra time has been given to classics, three or four lessons a week, which were occupied with free composition and a little trans-

lation in prose, and the beginnings of Latin verse; but now there is a classification of those who remain at school, each taking up the study which he is best fitted for or which is marked out for him by circumstances. It will be most convenient now to consider the two languages together, and to take up separately the various questions that meet us—namely, reading and aids to reading, free composition and translation into Latin or Greek, and grammar.

3. Latin and Greek in the Sixth Form.

Three years, or thereabouts, will be spent in the specialised work. It is desirable, of course, to subdivide the boys somewhat, but that does not concern us here; our object is to suggest general lines of study for this final stage; the master must himself arrange details, settle the order of authors and apportion the time. Roughly speaking, about two-thirds of the school time will now be given to the special subject; the rest, for classical boys, will be given to German (French being dropped out of the school course), English, and mathematics.

Reading.

Certain authors of the first importance must be thoroughly studied; amongst them Cæsar's 'Gallic War,' Virgil, Horace (with a few exceptions), Homer, Sophocles, and Thucydides. Others too big for complete reading, or unsuitable for young minds, must be studied in selected portions: Cicero, Livy, Tacitus, Plautus, Lucretius, Catullus, Juvenal and Martial, Plato, Demosthenes, Herodotus, Æschylus, Euripides, Aristophanes. Excursions may be made amongst the others.

Authors of the first class should be read through, since they are manageable in size, and each is perfection in his own line. Cæsar may be read without preparation in the afternoon lessons of a term or two. Virgil needs preparation; the morning work of two terms will

suffice for the 'Æneid,' the other work being taken as occasion serves. It makes no difference if parts of Virgil have been read before; the 'Æneid' should be now read as a whole. Homer's 'Iliad' and 'Odyssey' alternately may be read in class, the other work being done by the boys alone. Of Sophocles the three Œdipodean plays repay the closest study, the others being read more cursorily. Thucydides should be a standing dish, some being taken each term. In all cases, the works must be read complete, and with as little interruption in the way of notes as possible; the boys ought to have complete texts as far as may be, annotated editions and sometimes translations being used for revision; whilst the master's revision work is not to drill the form in translation so much as to bring out the literary qualities of the works read. Infinite harm is done by the use of annotated school-books containing detached portions of a complete book. These notes contain a great deal of help which ought not to be given at all, and a great deal of information which is not needed for the understanding of the text; they are useful to help incompetent masters, but for boys they distract the attention from the text, burden the memory, weaken self-reliance—in fine they are an almost unmitigated evil. The kind of note which is useful is the comparison of an author with himself, or the illustration by another passage, which is looked up in the text by the class in the course of the lesson; necessary information is generally best discovered by the learner himself from his books of reference. With exceptionally difficult authors, such as Thucydides, more than this may be necessary; but never so much as is given in the current school editions. It is desirable in the interests of all that their use should be discontinued.

A good reference library is indispensable; the master will frequently refer his pupils to a standard

work, which they will then read and extract from for themselves. Pictures and models should also be at hand, for the illustration of antiquities.

Method of Reading.

The question now arises, how far the authors should be rendered into English. It should never be forgotten that our object is the mastery of Greek and Latin; and this is only to be attained if the class be able to use the languages in the same way as natives, even if not with the same ease. Thus, if we may suppose the meaning of the text to be understood, the proper way to treat the text is to read it aloud in the original, questions and explanations being given in the same language. It is possible to make sure, at this stage, that a text of ordinary difficulty is understood, without the help of translation, since the pupils will have a vocabulary large enough to paraphrase in the same language. Masters will sometimes find the Greek scholia useful in preparing their lessons with this view. Most of Virgil and Horace, much of Cicero, the dialogue of Greek tragedy, and, indeed, the chief part of most authors, can be read aloud in class, after preparation, with only occasional use of an English word or phrase; on the other hand, it is well to translate all difficult passages, such as the choruses of a Greek play, before reading them aloud. But whether translated or not, every word should be read aloud, with careful attention to phrasing and expression as well as to quantity. By this method all the work of a classical lesson will help to perfect the boys' mastery of ancient idiom and vocabulary; whereas, to spend the time in translation is to give a lesson in English. After the allotted task has been read, notes should be given by the master, difficulties discussed and illustrated, and questions asked, to be answered aloud or on paper.

It is necessary, however, not to neglect translation;

only we have to bear in mind that translation is an art quite distinct from the mastery of a language. By translation our boys are finally tested; and, to do it well, needs idiomatic knowledge of both languages, with taste and ingenuity. But the task will be much easier than might be supposed if we assume what is assumed in this essay: (1) That the art of expression in English has been already systematically taught, and (2) that the understanding of Greek and Latin has been attained by the methods above described. A little practice now suffices to link the two together, and we are enabled altogether to avoid the atrocious nonsense which is always to be found in a boy's crude efforts, when he knows neither English nor Latin and Greek.

'Unseens.'

For this nonsense, the 'unseen paper' is largely responsible, and the 'unseen' will have a very small part in our scheme. Wide reading makes unseens less necessary from any point of view, and regular practice in making out passages at sight can be got by setting for translation on paper unprepared parts of any author who may be read. Few tasks are more wearisome and intellectually deadening than to translate a succession of unseen pieces, without context and incomplete as these usually are.

Grammar.

If all grammatical questions are discussed and driven home as the books are read, there will be no need for special grammar lessons, except one now and then to group the knowledge already gained into proper form, and to explain its principles more fully. Papers will be set on this subject occasionally, and the pupils directed to the proper books for further information; but grammar questions or lectures on topics which have not occurred in reading are not educative, they are of the nature of cram. These a boy may assimilate from some

motive of self-interest, may learn by heart in fact; he will gain no other good from them than is to be got from a piece of disjointed information.

Composition.

Just as in reading our aim is the understanding of an author's expression, so in composing, it is the correct and idiomatic use of the language studied to express our own thoughts. In the early stages, when the pupil knew little, we supplied him with the material, and asked him to combine it afresh; as his command of material increases, we give him less and less, until at last we need only supply the theme. There must now be constant exercise of this kind; every author read should be imitated, similar themes being suggested for the pupil to work out in his own way. It is surprising what ease and quickness in composing is the result of this method; even more surprising is the interest and originality of the work. There is nothing mechanical about it; the pupil is trained to work from within, to think and to express his own thoughts. Here, as before, translation from English into Latin and Greek must be practised, but only after mastery has been gained by original composition. It may be laid down as a principle that no piece ought to be set for translation unless it is such that the pupil could have written it as an original piece; unless, that is, he has already expressed similar thoughts in original composition, and has learnt to use the constructions necessary, and knows most of the words. The un-idiomatic renderings which jar us in such translations are due generally to a lack of knowledge how the Greek or Roman would have expressed a given thought; now we teach the pupil how to do this before he translates, and thus save him most of the mistakes which he would otherwise certainly make. In translating, then, he does not learn Greek or Latin idioms, but he practises what he has learnt.

Nothing has been said so far as to verse-composition, although I have just implied that it would not be omitted. As a fact, verse-writing is a very valuable exercise, except for the few who are incapable of it; but it is not possible to teach it to all in the same perfection. All boys who read a Latin or Greek poet ought to work through an elementary book of versifying, if only to teach them how to scan; they are not likely to learn without. But for many boys their verse-writing will stop there. Latin hexameters or elegiacs may be so taught in the Fifth Form; Greek iambics in the first year of special work in the Sixth. As soon as the elements are mastered, original imitative verse should be set; it is necessary, however, for this purpose to have learnt a good deal by heart. Then, as before, verse translations may be set as soon as the pupils have gained facility in technique. I believe that verse-writing is indispensable to the true appreciation of the poetry which is read, and that, so far from being a waste of time, it adds enormously to the composer's mastery of the language, and helps his prose by practising him in a more difficult task. Of course, discretion must be used; too much time must not be given to it.

Verse.

In the last school year, it is very desirable that some means should be taken to give the pupils an idea of the scope of Latin and Greek literature. Some short history of literature may be read out of school, such as Mackail's 'Latin Literature' or Murray's 'Greek Literature;' such books, however, as deal with many authors never before heard of, must not be learnt in detail. But it is the proper task of the master to see that before his pupils leave school they are informed of the prime importance of these literatures in the history of thought. He should explain that besides the classical

Litteræ Humaniores.

authors read in school, each language includes a host of others; the Latin language lasting throughout the Middle Ages, being still a living speech to Erasmus and Milton, and including all the materials for the history of Europe down to recent times; Greek containing the pioneers in every branch of human endeavour, not only poetry and philosophy, but mathematics, natural science and medicine, politics, theology and religion, and itself surviving in modern Greek, the heir of Homer by direct and unbroken descent. Specimens of these later writings should be given where possible, and at all events no boy should leave school without realising the vital connexion of both Latin and Greek with the modern world. Thus they may perhaps be saved some of the insensate blunders which their fathers are making in this generation.

FOR FURTHER READING.

Dettweiler, *Lateinischer Unterricht.* Munich, Beck, 1906; *Griechischer Unterricht.* Munich, Beck, 1898.

W. H. S. Jones, *The Teaching of Latin.* Blackie, 1904.

G. Michaelis, *Welche Förderung kann der Lateinische Unterricht an Reformschulen durch das Französische erfahren?* Marburg, Ehrent, 1902.

H. Perthes, *Zur Reform des Lateinischen Unterrichts auf Gymnasien u. Realschulen.* Berlin, Werdman, 1873–5.

K. Reinhardt, *Die Frankfurter Lehrpläne.* Frankfurt a/M., Diesterweg, 1902; *Die Schulordnung in Comenius u. die Frankfurter Lehrpläne.* Leipzig, Voigtländer, 1894.

U. von Wilamowitz-Möllendorff, *Griechisches Lesebuch.* Berlin, Weidemann, 1904.

W. H. Woodward, *Education during the Renaissance.* Cambridge, 1906; *Vittorino da Feltre.* Cambridge, 1905.

SPECIMEN LESSONS: GREEK PARAPHRASES.

SECOND YEAR OF GREEK.

A convenient method of paraphrase is this: the master reads the text, pausing at any word or phrase which he wishes to be paraphrased. If no paraphrase is forthcoming, he must supply it himself. The Attic dialect is used for paraphrase, as the normal. Questioning is another method or a necessary complement.

Iliad iv. 326–7.

MASTER. ὣς ἔφατο . . .
BOY. οὕτως ἔφη.
MASTER. Ἀτρεΐδης.
BOY. ὁ Ἀτρέως υἱός.
MASTER. . . . Ἀτρεΐδης δὲ παρῴχετο . .
BOY. παρῆλθεν.
MASTER. γηθόσυνος κῆρ . . .
BOY. χαίρων τὴν καρδίαν.
MASTER. ὣς ἔφατ', Ἀτρεΐδης δὲ παρῴχετο γηθόσυνος κῆρ.
BOY. οὕτως ἔφη, ὁ δ' Ἀτρέως υἱὸς παρῆλθε χαίρων καρδίαν.
MASTER. εὗρ' υἱὸν Πετεῶο Μενεσθῆα πλήξιππον . . .
BOY. ἱππότα.
MASTER. ἢ τί;
BOY. ἐλατῆρα ἵππων, ὃς πλήττει τοὺς ἵππους.
MASTER. τίνι δὲ πλήττει αὐτούς;
BOY. οὐκ οἶδ' ἔγωγε.
MASTER. τῷ πλήκτρῳ δή· λέγε οὖν, τίνι;
BOY. τῷ πλήκτρῳ πλήττει τοὺς ἵππους.
MASTER. ἐλατὴρ δὲ τίς ἐστιν;
BOY. ὃς ἂν ἐλαύνῃ τοὺς ἵππους, ἐλατήρ ἐστιν.

After a similar exercise on the whole lesson, the boys will read out the text, uninterrupted.

SIXTH FORM.

Here less paraphrase is necessary, and larger units may be taken. Here, as above, paraphrase may be used as an alternative to translation, or both may be employed on the same passage. The master need not read out at this stage.

Sophocles, Electra, 328–331.

BOY. *τίν' αὖ σὺ τήνδε πρὸς θυρῶνος ἐξόδοις ἐλθοῦσα φωνεῖς, ὦ κασιγνήτη, φάτιν . . .*

MASTER. *κασιγήντη ;*

BOY. *ἀδελφή·*

MASTER, *ἀδελφὴ δὲ τίς ἐστιν ;*

BOY. *ἣ ἂν τῆς αὐτῆς μητρὸς πεφυκυῖα ᾖ.*

MASTER. *τί οὖν ἐρωτᾷ ;*

BOY. *ποῖα ταῦτα λέγεις, ἀδελφή, πρὸς ταῖς θύραις ;*

MASTER. *πρὸς τίσι θύραις ;*

BOY. *ταῖς τῆς αὐλῆς δῆτα.*

MASTER. *ἀνάγνωθι πόρρω.*

BOY. *κοὐδ' ἐν χρόνῳ μακρῷ διδαχθῆναι θέλεις θυμῷ ματαίῳ μὴ χαρίζεσθαι κενά ;*

MASTER. *ἐν χρόνῳ μακρῷ ;*

BOY. *μετὰ τοσοῦτον χρόνον, ἢ τοσοῦτον χρόνον· διδασκομένη οὐ μανθάνεις.—ἀλλὰ τί ἐστι τὸ χαρίζεσθαι ;*

MASTER. *τὸ ποιεῖν τι πρὸς χάριν, ὥστε ἀρέσκειν.*

LATIN COMPOSITION.

THIRD OR FOURTH YEAR OF LATIN.

Time—30 minutes *viva voce*; 15 writing.

(This is given with its mistakes as it was done. The boys are directed never to let a word pass which they do not understand.)

MASTER. Psittacus quid est?

BOY. Avis est, qui homini vocem imitatur.

MASTER. Homini?

A BOY. Hominis.

MASTER. Quid est igitur psittacus?

BOY. Avis est psittacus, qui hominis vocem imitatur.

MASTER. Humanam vocem dic.

BOY. — qui humanam vocem imitatur.

MASTER. Fabulam igitur vobis recitabo de psittaco. De quo?

BOYS (*in chorus*). De psittaco fabulam nobis recitabis.

MASTER. Erat quondam psittacus, qui in cavea inclusus est.

A Boy. Cavea quid significat?

Master. Nos in domibus habitamus: ubi aves includimus? comprehendisne?

Boy. Comprehendo.

Master. Quid comprehendis?

Boy. Aves in cavea habitare comprehendo.

Master. Hic psittacus igitur se liberare voluit. Quid voluit?

Boys. Se liberare voluit.

Master. Now combine those two sentences.

A Boy. Psittacus erat quondam, in cavea inclusus, qui se liberare voluit.

Master. Quid faceret igitur ut se liberaret? Fraudem commentus est.

Boys. Non comprehendimus quid dicas.

Master. Cape tu calcem et scribe: comminiscor, commentus, comminisci. [*He does so.*] Comminiscor idem significat quod facere constituis. At fraus?

A Boy. Dolus malus. [*This came from the Reading Lesson.*]

Master. Ita. Fraudem commentus est psittacus noster.—Now combine those three sentences.

A Boy. Psittacus erat quondam, qui cavea inclusus, ut se liberaret fraus commentus est.

Master. Fraudem commentus est: recita! [*He repeats it.*] Fraudem commentus est huiusmodi. Non edebat, non bibebat, humi se prostravit.

A Boy. Humi quid significet?

Master. Numquis scit quid significet?

A Boy. In terra.

Master. In terra, in solo. Humi se prostravit, et simulatus est se esse mortuom.

Boys. Non comprehendimus.

Master. Scribe tu: simulo, -are. Anglice quid significet?

A Boy. *Pretend.*

Master. Psittacus simulavit se esse mortuom. Quale autem esse videtur corpus, ubi mortuus est aliquis?

A Boy. Rigidum.

Master. Rigidum videtur, rigent membra. Scribe: rigeo, etc.—Combine those sentences.

A BOY. Psittacus, cum se humi prostravisset, rigidis membris se esse mortuom simulavit.

MASTER. Mox dominus redit : caveam conspicit : videt quasi mortuom psittacum suom.—When you want to describe a thing vividly, use short sentences without conjunctions.—Dicite iam ; quid fit ?

BOYS. [*They repeat the sentences.*]

MASTER. Dominus de fato questus . . .

A BOY. Fato quid significet ?

MASTER. Fatum est numen deorum. De fato igitur est questus, quia magni emerat. Iam portam aperit, corpus quasi mortuom in viam eicit.—Combine those sentences.

A BOY. Cum advenisset dominus, fatum questus.

MASTER. De fato.

THE BOY. De fato questus, quia magni emerat psittacum, porta aperta corpus in viam eicit.

MASTER. Universi. [*They repeat this together once or twice.*] Continuo psittacus alis se in aera dedit, et Vale, inquit, domine : memento autem non omnia esse talia, qualia videntur. Quid dicit ?

BOYS. Vale, domine : meminito.

MASTER. Memento.

BOYS. Memento autem, talia qualia videntur non esse.

MASTER. Memento non omnia esse talia qualia videntur. Scribite iam. [*They do so.*]

(Fifteen minutes allowed.)

PSITTACUS FRAUDULENTUS.

Erat quondam psittacus in cavea inclusus qui voluit se liberare. Itaque hanc fraus commentus est. Nihil bibebat, nihil edebat, sed simulavit se mortuum esse. Rigentibus membris, se humi prostravit. Dominus rediit. Caveam inspexit. Vidit psittacum humi prostratum. Itaque de fato conquestus, quia magni emerat psittacum et putabat eum mortuum esse, corpus in viam jacuit.

Continuo avis in aera se levavit. "Vale, domine," inquit, "memento autem non esse omnia talia qualia videntur."

Psittacus avis est, quae omnibus coloribus est. Erat quondam psittacus qui in cavea inclusus est. Sed psittacus tristis

erat, et voluit se liberare. Itaque hanc fraudem commentus est. Non edebat neque bibebat, sed membris rigentibus se humi prostravit. Dominus mox ad caveam venit et cum suum psittacum prostratum quem magni emerat, humi quasi mortuum vidisset, de fato conquestus est. Sed quid faceret? Psittacus videtur mortuus esse. Ex cavea igitur psittacum iecit. Sed psittacus non mortuus est, et in aerem levavit, et "Vale," inquit, "memento autem non esse talia qualia videntur."

Erat quondam psittacus aliquis qui, in cavea cum inclusus esset, voluit maxime se liberare ut volaret in coelum. Quid faceret? Statim, hanc fraudem commentus est. Constituit se simulaturum esse mortuus esse. Igitur nihil edebat, nihil bibebat sed humi rigentibus membris jacuit prostratus. Nunc putabat, a domino se abiiciturum iri. Mox rediit dominus, conspexit caveam, psittacum quasi mortuum visit. "Heu," inquit, "quia hoc? Meus psittacus quem magni pretii emeram mortuus est." Tum questus de fato, aperuit portam caveae ut imponeret manum qua psittaci corpus abiiceret. Cepit corpus in manu et cum ante fores portavisset in viam abiecit. Continuo psittacus dolosus in coelum volavit. "Vale," inquit, "domine."

A GREEK LESSON.

FIFTH FORM: Average age, 15½.

This is a class of average boys, who are in the second year of Greek. All began Greek in the Perse Grammar School except one, whose exercise is marked H; he is a year older than the rest, and had elsewhere learnt Greek for a year on the current grammar-book system; all the others have learnt orally from the first. Two may possibly specialise in classics (A and E), two will specialise in mathematics (D and H), two in science (B and C), one in history (F), one in nothing (G). B came from an elementary school.

The lesson is recorded, so far as I was able to record it, exactly as it was given. Something may have been omitted, but nothing has been added; there is no change, except in one word in which the master himself was wrong; but since the mistake was faithfully reproduced, it is instructive for him only. The exercises are exactly reproduced in every other particular.

Certain mistakes, such as the omission of the augment, have been made because the class had been reading Homer.

It will be seen that the boys' imaginations have been at work, and that the method is clearly the opposite of mechanical; this is, to my mind, the chief merit of an oral method. It is unnecessary to point out how profound and far-reaching the effect must be on the national mind, if for a generation the school teaching should tend to exercise the imagination, instead of being mechanical. I would also point out that H, who has learnt Greek for three years, and has had the advantage, if it be an advantage, of a drill in mechanical grammar before the rest began, is the least satisfactory of the set, although his ability is above the average. The conversational answers are, as a rule, quite correct.

FIFTH TERM OF GREEK.

Subject: New Vocabulary, appropriate to spring. Practice of indefinite constructions, indirect question, instrumental case, genitive of time.

Time, 45 minutes.

[It is often useful to make as though a lesson were unpremeditated; here we are helped by the chance that someone is a minute late.]

MASTER. *ποῦ 'στιν ὁ 'Αλέξανδρος;*

BOYS (*in chorus*). *οὐκ ἴσμεν.*

MASTER. Complete the sentence; you know how it should be done. Repeat the question, changing the direct to the indirect pronoun, *ὅστις* for *τίς*, *ὁπότε* for *πότε*. Now: *ποῦ 'στιν ὁ 'Αλέξανδρος;*

BOYS.[1] *οὐκ ἴσμεν | ὅπου 'στιν | ὁ 'Αλέξανδρος.*

[*Enter Alexander.*]

MASTER. *ἰδοὺ ὁ 'Αλέξανδρος.* [*No answer: expectant look on the faces.*] *ἆρ' οὐκ ἴστε ὅτι σημαίνει τὸ ἰδού;*

BOYS. *οὐκ ἴσμεν | ὅτι σημαίνει | τὸ ἰδού.* [*They pronounce ἰδού some right and some wrong.*]

MASTER. *ὦ Περσεῦ, ἀνάβα ἐπὶ τὸ βῆμα.*

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[1] The vertical lines denote a pause. By pauses, the phrasing is regulated in chorus work.

PERSEUS. [*does so*] ἀναβαίνω ἐπὶ τὸ βῆμα. ὦ φίλοι, τί δρῶ;

BOYS. ἀναβαίνεις ἐπὶ τὸ βῆμα. ὦ διδάσκαλε, τί δρᾷ;

MASTER. ἀναβαίνει ἐπὶ τὸ βῆμα. σὺ δὲ λάβε τὴν ἄσβεστον.

PERSEUS. λαμβάνω τὴν ἄσβεστον [*question and answer as before*].

MASTER. γράφε τὸ ἰδού. [*He does so.*] That means, See!

BOY. Please, sir, what does ἰδού come from?

MASTER. Does any one know?

ONE OR TWO BOYS. ὁρῶ, ἰδεῖν.

BOY. But what part is it?

MASTER. ἰδέ would be active imperative of ἰδεῖν, this is middle. ἀλλὰ ἀνέμνησέ με τοῦτο—[*a boy holds up his hand*] do you know what that means? [*Pause.*] ἀναμιμνῄσκω.

A BOY. To remember.

MASTER. No, to remind, remember is ἀναμιμνῄσκομαι, the passive. ἀνέμνησέ με τοῦτο γραφῆς τινος Ἑλληνικῆς, ἥνπερ ἔχω που ἐνταῦθα. [*Finds it, or sketches it on the board.*[1]] τί ὁρᾶτε;

BOY. ὁρῶ ἐν τῇ γραφῇ τρεῖς ἀνθρώπους

MASTER. ποίους;

BOY. ἕνα ἄνδρα καθήμενον, ἕνα . . .

MASTER. τὸν μὲν ἕνα ἄνδρα καθήμενον . . .

BOY. τὸν μὲν ἕνα ἄνδρα καθήμενον, ἕνα δὲ ἑστῶτα, ἕνα δὲ . . .

MASTER. ἀλλὰ παῖς ἐστιν οὗτος. τί δὴ δρᾷ ὁ παῖς;

BOY. προτείνει τὴν χεῖρα . . .

MASTER. ποτέραν χεῖρα προτείνει;

BOY. τὴν δεξιὰν χεῖρα προτείνει, δεικνὺς ὄρνιθα.

MASTER. ποίαν τινὰ ὄρνιθα;

BOY. οὐκ οἶδα ὁποίαν τινὰ ὄρνιθα δείκνυσιν ὁ παῖς.

MASTER. τίς ὄρνις ἔρχεται ἦρος;

BOY. τὸ ἦρος τί σημαίνει;

MASTER. γράφε σύ, ὦ Περσεῦ· ἔαρ, ἦρος, ἦρι. νῦν δὴ τίς οἶδεν ὅτι ἐστὶ τοῦτο; μόριον γάρ ἐστιν ἐνιαυτοῦ.

A BOY. Spring.

MASTER. ἦρος οὖν τίς ὄρνις ἔρχεται;

BOY. The cuckoo.

MASTER. ναί, ὁ κόκκυξ· (γράφε σύ, κόκκυξ, κόκκυγος·) ἔστι δὲ καὶ ἄλλη· γράφε· χελιδών, χελιδόνος. Ἀγγλιστὶ πῶς καλεῖται;

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[1] See Baumeister, *Denkmäler*, fig. 2128; Macmillan's *Atlas of Antiquities* 64[10].

BOY. Swallow.

MASTER. *τίς οὖν ὄρνις ἐκείνη ;*

BOY. *χελιδὼν ἐκείνη.*

MASTER. *εὖ λέγεις, χελιδὼν ἐκείνη γε. θέασαι δὴ τὰ γράμματα ταῦτα ἅπερ ἐξίεται ἐκ τοῦ στόματος. ὁ γὰρ παῖς φησιν, ἰδοὺ χελιδών· ὁ δὲ ἀνὴρ ὁ καθήμενος, νὴ τὸν Ἡρακλέα, αὑτηί.* [*This is explained in English.*] *ὁ δὲ ἀνήρ φησιν ὁ ἑστώς, ἔαρ ἤδη. κατάβα νῦν, ὦ Περσεῦ.*

PERSEUS. *καταβαίνω ἀπὸ τοῦ βήματος.*

MASTER. *σὺ δ', ὦ 'Αλέξανδρε, ἀνάβα.*

ALEX. *ἀναβαίνω μὲν ἐπὶ τὸ βῆμα, λαμβάνω δὲ τὴν ἄσβεστον.*

MASTER. *διὰ τί;*

ALEX. *ἵνα γράψω τὰ γράμματα ἐπὶ τῷ πίνακι.*

MASTER. *πρῶτον δὲ ἀπομόργνυ ταῦτα τὰ γράμματα.*

ALEX. *ἀπομόργνυμι δή.*

MASTER. *λέγετ' οὖν μοι, ὦ παῖδες, τί γίγνεται ἦρος ἐν ἀγροῖς ;* [*No answer.*] I am going to describe what happens on a farm at this season. What is it?

BOYS. Ploughing and sowing.

MASTER. Yes, and reaping later. I am going to give you the words for all three, if you don't know them, and then arrange a sentence for each, all in one form.

A BOY. Please, sir, what is a farm in Greek?

MASTER. *χωρίον,* or sometimes *ἀγροί. γράφε σύ. χωρίον, μὴ χώριον, ρί, ρί.* [*He accents it.*] *ἀπόκριναι δὴ σύ, τί γίγνεται ἦρος ἐν τοῖς ἀγροῖς ;* [*No answer.*] *γράφε· ἀρῶ, ἀροῖς.* Go through the present tense.—Now the imperfect.—The future and aorist are irregular: *ἀρόσω, ἤροσα.*—Give the moods of *ἤροσα·—ὃς ἂν ἀρόσῃ, καλεῖται ἀροτήρ. γράφε, ἀροτήρ, ἀροτῆρος. τί καλεῖται ἐκεῖνος ὃς ἂν ἀρόσῃ ;*

BOYS. *ἀροτὴρ | καλεῖται | ἐκεῖνος | ὃς ἂν ἀρόσῃ.*

MASTER. *ποίῳ δ' ὀργάνῳ ἀροῖ ὁ ἀροτήρ ;*

A BOY. *ἀρότρῳ ἀροῖ ὁ ἀροτήρ.*

MASTER. *ὅταν ἀροῖ τῷ ἀρότρῳ ὁ ἀροτήρ, γίγνεται ἄροτος. τί γίγνεται ;*

BOYS. *ἄροτος | γίγνεται | ὅταν ἀροῖ | τῷ ἀρότρῳ | ὁ ἀροτήρ.*

MASTER. *μετὰ τοῦτο σπείρει σὺ δὲ γράφε τὸ σπείρω. τί δέδρακε ;*

BOYS. *γέγραφε | τὸ σπείρω*

MASTER. ὃς δ' ἂν σπείρῃ, καλεῖται σπορεύς. γράφε.—τί καλεῖται;

BOYS. σπορεὺς | καλεῖται | ὃς ἂν σπείρῃ.

MASTER. σπείρει δὲ σπέρματα ὁ σπορεύς. γράφε τὸ σπέρμα.—τί σπείρει;

BOYS. σπέρματα σπείρει | ὁ σπορεύς.

MASTER. ὅταν δὲ σπείρῃ σπέρματα ὁ σπορεύς, τί γίγνεται;

BOYS. οὐκ ἴσμεν | ὅτι γίγνεται | ὅταν σπείρῃ σπέρματα | ὁ σπορεύς.

MASTER. σπορὰ γίγνεται, ὅταν σπείρῃ σπέρματα ὁ σπορεύς. λέγετε νῦν ἅπαντες. [*They do so.*] μετὰ δὲ ταῦτα θερίζει. γράφε σύ, θερίζω, θεριῶ, ἐθέρισα. Give the moods.—ὃς ἂν θερίσῃ, ὀνομάζεται θεριστής. γράφε. Decline θεριστής, like πολίτης.—λέγετε δή· τί ὀνομάζεται, ὃς ἂν θερίσῃ;

BOYS. θεριστὴς | ὀνομάζεται | ὃς ἂν θερίσῃ.

MASTER. θερίζει δὲ δρεπάνῳ ὁ θεριστής. γράφε.—ποίῳ οὖν ὀργάνῳ;

BOYS. δρεπάνῳ | θερίζει | ὁ θεριστής.

MASTER. ὅταν δὲ θερίσῃ τῷ δρεπάνῳ ὁ θεριστής, θέρος γίγνεται. γράφε.—τί γίγνεται;

BOYS. θέρος | γίγνεται | ὅταν θερίσῃ | τῷ δρεπάνῳ | ὁ θεριστής.

MASTER. γράφετε νῦν ταῦτα.

[*They are written out, first with the words in view, then after these have been rubbed out. The final form is :*]

1. ὅταν ἀροῖ τῷ ἀρότρῳ ὁ ἀροτήρ, ἄροτος γίγνεται.
2. ὅταν σπείρῃ τὰ σπέρματα ὁ σπορεύς, σπορὰ γίγνεται.
3. ὅταν θερίσῃ ὁ θεριστὴς τῷ δρεπάνῳ, θέρος γίγνεται.

MASTER. τήμερον οὖν, παῖδες, συγγράψετέ μοι μῦθόν τινα οἴκοι. ἔστι γάρ τοί τις ἀνὴρ ἐν τῇ σελήνῃ, ὅσπερ ὀνομάζεται ὁ σεληνίτης· οὗτος δὲ ἐκπίπτει ἀπὸ τῆς σελήνης—ἴστε ὅπως;

BOYS. οὐκ ἴσμεν.

MASTER. τί δέ; ὁ Ζεὺς ὀργιζόμενος ῥίπτει αὐτόν· ὡς καὶ ἔρριψε τὸν Ἥφαιστον κατὰ τὸν Ὅμηρον· ἴστε ἄρα νῦν; τεταγὼν . . .

A BOY. τεταγὼν ποδὸς ἀπὸ βηλοῦ θεσπεσίοιο.

MASTER. πόσον δὲ χρόνον ἐφέρετο;

A BOY. πᾶν ἦμαρ φέρετο . . .

MASTER. ἐφέρετο. καὶ πίπτει ἐν χωρίῳ τινι, ἐν ᾧ ὁ γεωργὸς—τί δρᾷ;

BOYS. γεωργεῖ.

MASTER. ὁ δὲ παῖς ὁ τοῦ γεωργοῦ ἰδὼν τὸν ἄνδρα πίπτοντα πρῶτον μὲν νομίζει χελιδόνα εἶναι, ἔπειτα δὲ ὁρᾷ ὄντα ἄνδρα, καὶ ἐρωτᾷ μὲν ὁ Σελινίτης, ἀποκρίνεται δὲ ὁ γεωργός.

EXERCISES.

[These are printed without correction; they reproduce the boys' work, errors of accentuation, punctuation, &c., included.]

A.

περὶ τὸυ Δίος καὶ τὴς σελήνης.

'Η μὲν σελήνη πάλαι πανσέληνος ἀεὶ ἦν. 'Ο δέ Ζέυς, "'Ω σελήνη" φησιν "'Ουκ ἐθέλω ἀεὶ βλέπειν πάν τὸ προσώπον σόν, περιστρέφου ἱνα μή σέ βλέπω." 'Η μέν σελήνη ὀυ φήσι. 'Ο δέ Ζέυς, λαμβάνει τόν ἀνθρωπον, τόν ἐν τῇ σεληνῇ, σκέλει κάι βάλλει ἐκπόδων. 'Ο σελήνιος ἐπὶ τὴν γὴν πίπτει, καὶ ἐπι τούς ἄγρους, ἐν οἶς γεώργον εὕρισκει. "Χαίρε," λέγει ὁ ἄνθρωπος, ὁ ἀπὸ τής σελήνης "καὶ σὺ χαίρε, ὁ γεώργος φήσιν. Επειτα ὁ σελήνιος ἐρωτâ "ποῦ εἰμὶ, τις ἐι, καὶ τὶ δρâς? 'Ο γεώργος "ἐπὶ τὴς γης εἰ" φησιν "'Εγω σπόρευς εἰμὶ καὶ σπείρω σπέρματα. 'Ο μέν ἄλλος "οταν ὁ σπόρευς," φησι "σπέρματα σπείρῃ τὶ γιγνέται"? 'Αποκρίνει ὁ σπόρευς "ὁταν σπέρματα σπείρη ὁ σπορευς, σπορὰ γιγνέται." Μέτα δέ ταύτα ἐρωτâ ὁ σελήνιος, τὶ γιγνέται ἐκεὶ? "Αροτος γιγνέται, καὶ ἀροτὴρ τῷ ἀροτρῷ ἀροῖ.

'Επείδη ὁ σελήνιος ἐν γῇ οὐ πόλυν χρονον ἠγάγεν ἐρωτήσε τόν Δία ἱνα ἐς τὴν σηλήνην κατερχῆται. 'Ο δε Ζέυς, ἀπεῖ, ἐφ' ᾧ πανσέληνη ἐι μόνον ἀπάξ ἑκαστώ μηνὶ.

τούτο ἐστι ἀίτια ὅτι οὐκ ἐστιν ἀεὶ πανσέληνη.

B.

Ζεὺς ἀχνυμὲνος ἔριψε τὸν ἄνθρωπον τὸν ἐν τῇ σελήνῃ ἀπὸ τῆs σελήνης. ὅ σεληνίτης, πὰν ἦμαρ φερομένος, κατέπεσε ἐν τῇ Ἄγγιλῃ. ἔκει γεώργος εὗρε καὶ ἐκόμισα. αὔριον ὅ σεληνίτης περεπάτει πέρι τοῦ χώριου. ὅι δοῦλοι τοῦ γεωργôυ ἐσπείρων κἀὶ ὅ ἄνθρωπος ὅ ἄπο τῆs σελήνης ἔλεξε τῷ γεωργῷ "τὶ δρῶσι ὅι δούλοι:" "σπειρῶσι τὰ σπερμάτα" ἔφη ὅ γέωργος "ὅστις ἄν σπείρῃ τὰ σπερμάτα, τὶ ὀνομάζεται"—"σπόρευς ὀνομάζεται" ἔλεξε ὅ γέωργος. "χαρὶν οἶδα σοι'

ἔφη. ἔπειτα ὁ σεληνίτης καὶ ὅ γεώργος ἔβησαν ἔσ ἄλλον ἄγρον ἔν ᾧ ὅι δόυλοι ἀροῦσι. ό σεληνίτης οὔκ εἰδώς ὅτι ὅι δόυλοι ποιοῦσι, ἠρόετο. ό γέωργος ἔλεξε "ἄρουσι ἄγρον τῷ ἀροτρῶ"—καὶ τὶ ὀνομάζονται"—"ὅστις ἄν ἀρὸι τῷ ἀροτρῷ, καλέιται ἀρότος." ἔπειτα ἐβήσαν. ὅτε ἐβήσαν οἴκοιδε, ὅ γέωργος ἔλεξε τῷ ξενῷ, "τοῦ θερου θεριζὸμεν"—τίνι:—"τῇ δρεπάνῃ καὶ ὅταν ἀνθρώπος τις θερίζῃ, θερίστης ὀνομάζεται." "χάριν οἶδα σοι" ἔφη ό σεληνίτης καὶ ἔπειτα ἐδηδοκάντες, ἀνεβήσαν καὶ ἐκαθευδησαν.

C.

γεώργος πότε ἤργαζετο ἐν τοις ἀγρὸις και ἂιψα εἰδε τινα ἀνθρωπον πίπτοντα ἐκ τὸυ οὐράνου. ὁ ἀνηρ ὁ ἀπο της σελήνης ἐπέσε παρα τον γεωργον και, ἐπειδη ἀνέστη, ἐλέξε χαιρε! ὁ γεωργος ἐφη χαιρε! ἄλλα τὶς εἶ;

ὁ ξενος "ειμι" ἐφή" ὁ ἀνηρ ὁ ἀπὸ της σελήνης. ὁ Ζευς χωομενος, ἐριψε ποδος και με ἔβαλε ἐκ του οὐράνου· παν δ' ἦμαρ πεπτωκα. ἀλλ' ἀγε τις ἐι και τινα ἐστιν ταῦτα;

Γεω. *"εἰμι γεῶργος καὶ ἐκέινο ἐστιν το ἑμôυ χωρίον. νύνδε ἀρω τους άγρους τῳδε το καλλειται ἄροτρον.*

Σελ. *ὅταν ἄροις τους ἄγρους τι γιγνέται και τις καλλη;*

Γεω. *ὅταν ἄρω ἄροτος γιγνέται και καλλομαι ἀρότηρ.*

Σελ. *τι δρᾶ το ἄροτρον ὅταν ἄροις;*

Γεω. *ὅταν ἄρω το ἄροτρον ἀνατεμνει την γην ἵνα ῥαων σπειρῶ τα σπέρματα.*

Σελ. *καταλαμβανω ἀλλά μετα την σποραν, τι γιγνεται;*

Γεω. *οὖν τα σιτά φυει και ἐν τῳ θερι, θεριζω. ἀλλα διψησεισ, που. ἐλθε συν μοι ἐσ την ἐμου οἰκιαν και δειξω σοι ὀτι ἐσθίομεν ἐπί τῃ χθονι.*

Σελ. *χαριν οἰδα σοι. διψω μαλιστα και πεινω*
ἐπειτα ἐλθον ες την οἰκίαν και ἐφαγον και ἐπίον.

D.

ἦν πότε ἐν τῇ σελήνῃ ἀνθρώπος τις. πολὺ δὲ ἔβλαψε τὸν Δία. ὁ πατὴρ οὖν ἀνδρῶν τε καὶ θεῶν ποδὸς τετταγὼν ἔρριψε ἐκ τῆς σεληνῆς. πᾶν δὲ ἦμαρ ἔπεσε, ἅμα δὲ ἡλιῷ κατεδύντι ἀφίκετο ἐς ταυτὴν τὴν γῆν. ἦσαν δὲ ἐν τοῖς ἀγροῖς γεωργὸς καὶ παῖς ὁ παῖς πρῶτον εἶδε καὶ ἐβοήσε τῷ πατρὶ "ἴδου τὸν χελιδόνα." ἐνόμισε γὰρ εἶναι ὄρνιν "αὐτηῒ νὴ·τὸν Ἡρακλέα" ἀπέκρινε ὁ πατὴρ 'ἐὰρ ἤδη.' ἀλλα ταχὺ εἶδον αὐτὸν οὐκ εἶναι ὄρνιν ἄλλα ἀνθρωπὸν πιπτόνα ἐκ τοῦ οὐρανοῦ. ἔπεσε δὲ ὁ ἀνὴρ ἐν ἀλλῷ ἀγρῷ. καὶ ἐδράμε ταχ ἐς

αὐτὸν ὁ γεωργὸς καὶ εἰπὲ αὐτῷ 'σὺ, τὶς εἶ; καὶ ποδαπὸς; οὐ πότε γὰρ ἑώρακα ἀνθρωπὸν ὁμοῖον σοί.' ἀπεκρίνε ἐκεινὸς "ἀπὸ τῆς σεληνῆς ἔρχομαι, ἀλλὰ λέγε μοῖ ὅπου εἶμι καὶ σὺ ὁστὶς εἶ καὶ ὅτι δρᾶς ἐν τουτῷ τῷ ἀγρῷ." "ἐν νησῷ ὀνομάζεται Ἄγγλη εἶ, φήσι ὁ γεωργὸς 'καὶ τοῦτο ἐστὶν ἀροτρὸν. πρῶτον μεν σπέρματα σπειρεῖ ὁ σπορεὺς, ἔπειτα δε ἀροῖ ὁ ἀροτὴρ τῷ ἀροτρῷ καὶ τέλος, θεροῦ γενομενοῦ θεριζεῖ τὸν σῖτον ὁ θεριστὴς. ἄλλα σὺ πῶς ἦλθες ἀπὸ τῆς σεληνῆς ἐνθάδε;" 'ὦ' ἀποκρινεῖ 'ὁ Ζεῦς ἐρρίψε μὲ.' 'οἴμοι' φήσιν ὁ γεωργὸς. ἔλθε ἐς τὸ δώμα καὶ δώσω σοῖ σιτία. οὑτὼς ὁ ἀπὸ τῆς σεληνῆς ἀνὴρ ᾔει σὺν τῷ γεωργῷ ἐς τὸ δώμα.

ὑστερὸν δὲ ὁ Ζεῦς συγγνωμὴν εἶχε αὐτῷ καὶ ἐλάβε αὐτὸν αὖτις ἐς τὴν σελήνην. οὕτως ὃταν ὁρῶμεν τὴν σελήνην ὁρῶμεν καὶ τοῦτον τὸν ἄνθρωπον φερόντα ἐπὶ τῶν ὤμων ἄχθος μέγα κλημάτιδων καὶ ὀπίθεν αὐτοῦ κύνα.

E.

Ζεὺς εἰς τὴν Σελήνην μετὰ τοῦ ἐν τῇ Σελήνῃ κατὰ δαῖτα ἔβη, καὶ τοῦ ἐν τῇ Σελήνῃ βλάψαντος ὁ Ζεὺς ἔριψε, ποδὸς τεταγὼν, ἀπὸ τῆς Σελήνης. πᾶν δ' ἦμαρ ἔπιπτε, ἅμα δ' ἡλίῳ κατέπεσε ἐν Ἀχαίᾳ. παννύχιος μεν ἔμεινε ἐν ἀγρῷ, ἅμα δε ἑῷ εἶδε γεωργὸν τίνα ᾧ πάντα τὰ γενόμενα ἔλεγε. "οἴ μοι τοῦ ἀνθρώπου ἔλεξε ἔβλεψα σε ἔχθες καὶ ἔλεξα παῖδι τίνι, 'ἰδοὺ χελιδόνα μεγίστην νῦν ἕξομεν ἔαρ'." "πῶς ἄτοπη Σελήνη!" ἔλεξε ὁ ἀπὸ τῆς Σελήνης, "τὶ ἐστὶ τούτο;" "τούτο ἄροτρον ἐστὶ, καὶ τῷ ἀρότρῳ ἀροῖ ὁ ἀροτρεὺς, ὅταν δε ἀροῖ ὁ ἀροτρεύς ἀροτρῷ ἄροτος γίγνεται." "ἀλλὰ διὰ τὶ ἀροῖ ὁ ἀροτρεὺς;" "ἵνα σπειρῇ σπέρματα ὁ σπορεὺς, ὅταν δε σπειρῇ σπέρματα ὁ σπορεὺς σπόρος γίγνεται."

"ἀλλὰ διά τὶ σπειρεῖ ὁ σπορεύς;"

"ἵνα θερίζῃ ὁ θερίστης τὰ σῖτα, ὅταν δε θερίζῃ ὁ θερίστης τὰ σῖτα θέρος γίγνεται."

"ἀλλὰ δία τὶ θερίζει ὁ θερίστης;'

"ἵνα ἐσθίωμεν τὰ σῖτα."

"ὦ ποποῖ! οὐ καταλαμβάνω ταύτην τὴν Σελήνην.'

"οὐ Σελῆνη ἐστὶ ἀλλ' ἡ γῆ"

"οἴ μοι, ἐλπίζω δὴ τὸν Δία βαλεῖν με εἰς τὴν Σελήνην τὴν ἔμου.

F.

Characters *ὁ γεωργός, ὁ υἱός τοῦ γεωργοῦ, καὶ ὁ σεληνίτης.*

ὁ υἱός *ὦ πατερ, ἰδού χελιδόνα!*

ὁ πατήρ. ποῦ; (ὁ σεληνίτης προσπίπτει ἀπο τοῦ ὀυρανου) τίς εἶ; οἴ μοι του ἀνθρῶπου!

ὁ σελ. ὀυκ ἀνθρῶπος ἐιμί, ἀλλα σεληνίτης. ὁ Ζεύς μέ ἐβαλε ἐκ της σελήνης. πᾶν δ' ἦμαρ προσέπεσον, και νυν ποῦ ἐιμί;

ὁ γεωρ. ἐν τῃ 'Αγγλιᾳ ἐἶ, ὃυτοι οἱ ἀγροι ὁι ἐμοῦ ἐισίν.

ὁ σελ. ἀλλα τίνα ἐστι ταῦτα;

ὁ γεωρ. τοῦτο ἐστίν ἀρότρον

ὁ σελ. τί δρᾶς ἀρότρῳ;

ὁ γεωρ. ὁ ἀροτήρ ἀροῖ τῳ ἀρότρῳ

ὁ σελ. ὁταν ἀροι, τί γίγνεται;

ὁ γεωρ. ὅταν ἀροῖ ἄροτος ἐστίν. ταῦτα σπερματα ἐστί.

ὁ σελ. τί δρᾶς τοις σπερματοις;

ὁ γεωρ. ὁ σπορεύς σπείρει τοις σπερματοις.

ὁ σελ. ὅταν ὁ σπόρευς σπέιρῃ τί γίγνεται;

ὁ γεωρ. σπόρα γίγνεται

ὁ σελ. ἀλλα τότε τι γίγνεται;

ὁ γεωρ. θέρος γίγνεται, και ὁ θεριστης θερίζει το θέρος. ἀλλα συ ἠρώτησας πολλα ἐρωτήματα, νυν δε ἔλθε μοι, καί ἐσθίε ἄριστον, πεπείνηκας γαρ.

ὁ σελ. πεπείνηκα, καί ἐλεύσομαι σοῖ ἀσμενῶς.

G.

ὁ ἐν τῇ σελήνῃ ὀνομάζεται ὁ σεληνίτης καὶ ποτὲ Ζεύς ὀχθήσας ἔριψε τὸν σεληνίτην τεταγὼν ποδὸς ἀπὸ βηλοῦ θεσπέσιος: πᾶν δ' ἦμαρ ἐφέρετο, ἅμα δ' ἡλίῳ καταδύντι κατέπεσεν ἐν τῇ 'Αγγλίᾳ, ὀλίγος δ' ἔτι θυμὸς ἐνῆν. γεωργὸς δὲ ἐγεωγησε τοὺς ἄγρους καὶ, "ἰδοὺ," φησι, "χελιδόνα νὴ τὸν 'Ηρακλέα: ἔαρ ἤδη ἔρχεται."

καὶ ὁ σεληνίτης ἐν ἔνι τῶν ἄγρων τῶν τοῦ γεωργοὺ κατέπεσεν, φήσι δὲ "χαῖρε!" "χαῖρε," ἔφην ὁ γεωργὸς, "τὶς εἶ;" "ἐγὼ σεληνίτης εἴμι, καὶ συ;" "ἐγὼ γεωργὸς εἴμι." "τὶ ἔστιν γεωργὸς." "ἔστιν ὅστις ἀν γεωγῇ." "πότε γεωργεῖς;" "γεωργέω τοῦ ἠρὸς." "καὶ τὶ ἔστιν τοῦτο;" "ἔισιν οἱ μοῦ ἄγροι: ἔστιν τὸ μοῦ χωρίον." "τὶ δρᾷς." "ἐγὼ σπείρω;" "τὶ σπειρεῖς;" "σπειρῶ σπέρματα: ὅταν σπέρματα σπείρῃ τὶς σπορεὺς, σπορὰ γίγνεται." "καὶ τὶ ἔστι τοῦτο;" "ἔστιν ἄροτρος καὶ ἀρόω τῷ ἀρότρω." "ὅταν ἄροις τὶ γίγνεται;" "ἄροτος γίγνεται, ὅταν ἀροτὴρ τῷ ἀρότρῳ ἀροῖ." τὶ δρᾷς ἐν τῷ θέρῳ;" "ἐγὼ θερίζω καὶ θέρος γίγνεται." "καὶ πῶς ὀναμάζει;" "θερίστης ὀναμάζομαι." "κάριν οἶδα σοῖ, χαίρω δὲ σε εὐτυχοῦντα: χαίρων ἴθι, χαίρω ἀκούσας." "χαίρων ἴθι," ἔφην ὁ γεωργὸς.

H.

ὅ γεώργος ἔσπειρε τὰ σπέρματα, σπορεὺς γὰρ ἦν. ἰδοὺ μικρότατος ἄνηρ ἄνηλθεν, εἶχε σκήπτρον ἄργυρου ἐν τῃ χειρι. "χάιρε" ἔλεγεν ὅ γεωργος θαυμαζομενος. ἄλλα ὅ ἄνηρ ὀύκ ἐγνω την Ἑλληνικην γλωτταν και οὔκ ἔφη τῷ γεώργῳ. μετὰ δε ταῦτα ἔλεγον τοις σημειοις, "ἐγω" ἔφη ὅ μικρότατος ἄνηρ "σεληνίτης εἴμι. και ὅτι μεταλλῆσα τὰ ἄστρα ὅ μεγίστος Ζεὺς ἐρίψεν ποδος τεταγὼν ἀπὸ βήλου σηληναιοῦ πᾶν δε ἧμαρ φερὸμην και νῦν ἐν αὔτῃ τῃ γῃ κατεπεσον και ἰδῶν τοδε και σε ἀνηλθον" "θαυμαζω μαλιστα" ἔφη ὅ γεωργος και ηὔχετο τῳ Δῐι. "ἄλλα τίνα ἔστι ταῦτα" ἔφη ὅ σηληνιτης "οὔ γιγνώσκω ἕν." "πασα ἡ γὴ ἔστιν οἵ ἄγροι μοῦ και ἔγω γεώργος εἴμι. τοῦτο ἐστιν ὁ ἀροτρον ᾧ ὁ αρότηρ ἄροι" "χαριν οἶδα σοι" ἔφη ὁ σηληνιτης και μαθησομα την Ελληνικην γλωτταν ὡς ταχίστα.

SECTION VIII

MODERN LANGUAGES

The position which modern languages occupy in the curriculum of our schools has been, and is, steadily improving. Till quite recently, even in our best schools, the treatment of these subjects has been a national scandal. The absurdly short time devoted to the study of French and German was grudgingly accorded by an unsympathetic headmaster; nor was full advantage derived from these lessons—partly because the methods employed were bad, and partly because many of those who were engaged in teaching these languages had no pretensions to any special knowledge of the subject. Classical masters were often requested by the headmaster to teach French or German to their forms; and if they ventured to suggest that they knew no French or German, they were met with the reply that they could always keep one lesson ahead of their pupils! Much as one would like to believe that this state of things belongs altogether to the past, yet one is forced to admit that it has not quite disappeared from some of our schools. But there has undoubtedly been considerable improvement in recent years. The improvement is threefold. More time has been allotted to the study of modern languages; a leavening of properly qualified teachers has gradually been introduced into our schools; the old method of teaching a living language as if it were

a dead one has gradually given way to more rational methods.

Let us consider these three points in more detail. Things have been gradually improving since the time

Time Allotted.

(about 100 years ago) when French and Music were taught as extras at Rugby, down to the present day when many of our best preparatory schools devote six lessons a week to French. This, however, is exceptional, and in our public schools the state of things is still far from satisfactory. The time that should be given to a modern language and the age at which it should be commenced are questions which bristle with difficulties. Each school seems to require special treatment. All that we can do here is to consider general principles.

'The first preparation for the study of a foreign language is the acquisition of a thorough knowledge

Age for Beginning.

of the peculiarities of one's own language.' True as this statement of Dr. Sweet's is, it would not be possible to postpone the beginning of a foreign language till the age at which a boy may be said to have acquired 'a thorough knowledge of the peculiarities of his own language.' A fairly sound knowledge, however, will be admitted as indispensable, and this knowledge cannot be acquired much before the age of ten. This is indeed the age which Dr. Sweet eventually proposes as a suitable one for beginning the first foreign language, while Mr. Widgery placed it as late as eleven.

I am strongly of the opinion that French should be taught before Latin. It has been shown in Germany

French before Latin.

('Special Reports,' vol. iii. pp. 465–467) that Latin, far from suffering, actually gains by this postponement. A well-known German authority stated at the meeting of the Verein für neuere Philologie (held in Leipzig,

November 9, 1897), that, when visiting the Frankfort Gymnasium, he found the boys in Untersekunda (in their third year of Latin—age fourteen to fifteen) reading unprepared passages of Ovid 'mit raschem Ueberblick und gutem Verständniss.' Opinion after opinion in support of this view could be quoted. I would not begin French, then, before the age of ten, nor Latin till two years later ; nor should any other language, ancient or modern, on any account be begun until a further interval of two years has elapsed. No school-boy should attempt to learn more than four languages : English, French, Latin and Greek (or German as alternative to Greek). At many of our public schools they insist on a fifth language being begun. The result is that next to nothing is learnt either of the fifth language or of the language which has been sacrificed in order to make room for the new one. This maximum of four languages would be excessive for a school where the leaving age is fifteen to sixteen. In this case three languages (including the vernacular) should be the maximum.

School Hours.

During the initial stages of French, a lesson a day is essential. This can be reduced later on to four lessons a week, or even possibly to three, when other subjects are beginning to press their claims. I consider less than three periods a week to be almost useless. With two periods a week the pupils will be doing little more than marking time. Two lessons a week will certainly prevent them from forgetting what they have already learnt, but any appreciable progress will be out of the question.

When a second new language is begun six periods a week should, if possible, be allotted to it for the full period of two years—even more in the case of Latin on a classical side. After another two years,

and when a third new language is introduced, there must of course be a considerable reduction in the time given to the first two.

All these suggestions refer to cases in which the language is to be taught for its own sake. It is conceivable that a language may be required for some special purpose : *e.g.* German, to enable a science man to read a German science book, or a classical man to read German editions of the classics. Under these circumstances, the object of learning the language is entirely changed. It will not be studied for its own sake, but from a purely utilitarian point of view, and the method of teaching will have to be adopted accordingly.

Qualified Teachers.

The difficulty of obtaining properly qualified teachers has been one of the chief obstacles to any reform in our methods of teaching modern languages. The reasons for this dearth of men are obvious. As long as modern languages are not regarded seriously by the school authorities, men will neither take the trouble nor go to the expense of equipping themselves properly. Head masters who are really in earnest have rarely been unable to find good men. If they have failed to do so, they should try the simple expedient of offering to a modern language master the same salary and the same prospects as they do to their classical masters ; and there is little doubt that the right man would be forthcoming.

A classical, mathematical, or science master spends three or four years at the university and then proceeds, without any further training, as a rule, direct to a mastership at a public school, where a rise in salary and chances of a boarding house depend chiefly on seniority. But a properly equipped modern language master will, in addition to the usual university course, have spent one

or two years on the continent, studying the language, the manners, the customs and the educational methods of the people among whom he is living. He will not only, therefore, have spent more money on his equipment, but he will not be able to start his work in a school till one or two years after his classical or mathematical colleague—a grave disadvantage in many cases.

Another matter which requires serious consideration is the excessive number of hours the modern language master is often expected to teach. Mr. Fabian Ware, in comparing the *status* and conditions of work of English and Prussian modern language teachers says: 'There is one other advantage, which it is impossible to overestimate, though it is strange that it should be necessary to bring it before the notice of English authorities. In hardly any [Prussian] school is the teacher allowed to give more than twenty lessons a week. Nobody can accuse the Germans of possessing less power of endurance than the English, and yet it is considered by the former that a teacher of modern languages cannot exceed this number of weekly lessons with any chance of success. The general opinion is that even this number is too great, and I was informed that probably, owing to the representations of many experts, it would in the near future be reduced to eighteen. A German teacher never enters the class-room with a lesson unprepared, and to this preparation and to "corrections" he is expected to devote from twelve to sixteen hours a week.' And again: 'But whatever reforms are introduced, nothing can compensate for the disadvantage he (the English modern language master) suffers, when compared with the German teacher, from the regulations obtaining in many of our schools as to the number of hours he must devote weekly to actual class teaching. It is impossible to speak too strongly on this point. It is no exaggeration

to say that as long as this state of affairs continues all other reforms are futile.' ('Special Reports,' vol. iii. p. 546.)

It is essential that a modern language master should have had a thorough training in the theory and practice of phonetics. The question of the teaching of phonetics will be considered later.

The Reformed Method.

Modern languages have been taught for many years in all kinds of schools, and until comparatively recently, always in approximately the same way. Even admitting all the difficulties which the modern language master has laboured under—difficulties to which some brief allusion has already been made—can anyone claim that that way has met with even a reasonable amount of success? No one can have read the many articles, pamphlets, and books which have recently appeared on this subject without being firmly convinced that some considerable change is absolutely necessary. It seems that all who are competent to judge in this matter are agreed upon this point; differences of opinion only arise when it is a question of what changes should be made, what method should be adopted.

Many reformers have now been at work for a sufficiently long time to be able to judge of the results of their reforms, and in many cases to have their results judged for them by others. Germany is, perhaps, the country where reformers have been at work for the longest time and on the largest scale. Many people, some of them most highly qualified for the work, have had opportunities of studying the methods of the German reformers and of estimating their value and the results obtained by them. As far as I know, there has been extraordinary unanimity in the impressions received. Whether one consults the 'Special Reports' of the

Education Department, or the experiences of one's friends and colleagues, one hears nothing but praise of the excellence of the methods and the wonderful results achieved. Such evidence cannot lightly be put on one side, and practically all the 'new methods' that have been tried in our own country owe their inspiration to the German reformers.

Nearly ten years ago, Professor Dr. Emil Hausknecht, Director of the 12th Realschule, Berlin, wrote, with reference to the Reform Method: 'I am not in a position to offer any new principles, and it would indeed be bringing "owls to Athens," were I to raise again here long-winded theoretical discussions of principles which have long since been exhaustively described and clearly set forth—clearly set forth, at least, for any unprejudiced and independent thinker; while for those who are held bound in the fetters of deep-rooted custom and easy-going routine, the principles of the Reform Method will, I suppose, always remain a closed book.'

What was thus said of the state of things in Germany ten years ago might well be said of the state of things in England at the present day. I believe that all 'unprejudiced and independent thinkers' are ready to admit that the Reform Methodisers are at any rate on the right track. Such thinkers may not agree with all the changes introduced, but they admit that the principles underlying them are sound. I therefore take it for granted that the Reform Method requires no further justification here.

Allowing for the point of view, the principles of the Reform Method have been well summed up by the author of the pamphlet 'Aim and Principles of the International Phonetic Association.' They are as follows:

1. The first thing to be studied in a foreign language

is not the more or less archaic language of literature, but the spoken language of daily conversation.

2. The teacher's first care should be to make his pupils perfectly familiar with the sounds of the foreign language. To attain this end he will make use of a phonetic transcription, which should be employed to the exclusion of the traditional spelling during the first period.

3. The teacher's next aim should be to impart a perfect command of the commonest phrases and idioms of the foreign language. To obtain this result he will use connected texts, dialogues, descriptions and narratives, all as easy, natural and interesting as possible.

4. Grammar will at first be taught inductively, by grouping together and drawing general conclusions from such facts as are observed in reading. A more systematic study is to be kept for a later stage.

5. The teacher will endeavour to connect the words of the foreign language directly with the ideas they express, or with other words of the same language, not with those of the mother tongue. Translation will therefore be replaced, as far as possible, by object-lessons, picture-lessons, and explanations in the foreign language.

6. When, at a later period, written work is introduced, it will consist at first of the reproduction of matter already read and explained, then the reproduction of stories, etc., which the pupils have heard the teacher tell; free composition will come next; translation from and into the foreign language is to be kept to the end.

The method in its general principles being admitted to be sound, it remains to be seen how it can best be applied in the class-room. Modern language teachers have been gradually acquiring a considerable amount of knowledge on this point, based, in many cases, on

their own personal experience and also on that of other teachers, who are, as a rule, only too glad to discuss their successes and their failures with their colleagues. The most promising schemes have so often ended in failure in one direction or another; we have hoped for really astonishing performances and have been met with disappointment; but in spite of failure here and disappointment there, the fact cannot be gainsaid that the results obtained by the new method show a marked improvement on those obtained by followers of the old school.

Aims.

Before proceeding to discuss the practical application of these principles in the class-room, let us pause a moment to ask ourselves the question: 'What aim have we in view in the teaching of modern languages?' In answer to this question, let me quote from Coulton's 'Public Schools and Public Needs' (pp. 56, 57): 'To what end do we teach our boys French and German? Too many schoolmasters would answer cynically, "because it's a silly modern fad of the parents, and must therefore be humoured. . . ." But of serious answers there can only be three. We may look to the practical utility of the subject: in this case there can be no better test than to set the boy to read the language, to write it from dictation and out of his head, and to speak it. Or, again, we may regard the language simply as an instrument of culture, notwithstanding the fact that the boy is already learning one or two other languages which claim to be far more perfect instruments to the same end. Even from this point of view, it is difficult to understand how one can find any better test of a candidate's proficiency in a language, as an instrument of culture, than that of setting him to read it, to write it, and to speak it. The ancient Greeks, it is to be feared, would have been Philistine enough to

judge him by the last only of these three tests. The third possible answer is that of most people, that the study of French and German ought to be both practically useful and intellectually formative; and to this again the same reply as before is obviously applicable.'

It seems to me that this third answer, the answer 'of most people,' is the correct one. The study of a modern language ought to be both practically useful and intellectually formative. The further one gets in the study of a language, the more chance has that language of fulfilling both our objects. The intellectual culture that is to be derived from this branch of study can only be obtained during the later stages of instruction. This will be a superstructure of more or less elegance and finish, which can only be built on solid foundations.

One word of caution is necessary. We must not expect too much from any method, however excellent that method may be. Only a few of our best pupils, or those specially favoured in other ways, will even approach our ideal, while the vast majority will fall very far short of it.

We will consider, then, that our aim is to teach our pupils to read, write, and speak the language, as well as to understand it when spoken. This order does not pretend to be that of the relative importance of these aims.

Method

I will now attempt to sketch in outline a complete course of study, such as seems to me suitable for realising the objects set forth above.

The Course.

I will start with boys of ten, who are well grounded in English and are about to begin their first foreign language—French. It will be convenient to divide the course into four parts.

	Age
1. Introductory Course	10–12
2. Elementary Course	12–14
3. Junior Course	14–16
4. Senior Course	16–18

I have already referred to the necessity of the teacher having a sound knowledge of phonetics. It is for the introductory course that it is so particularly essential. Without some knowledge of phonetics on the part of the teacher it is impossible to obtain a good pronunciation, unless the pupil has very exceptional imitative faculties. All the teacher can do is to make the sound and hope that his pupil will be able to imitate it—which he will seldom be able to do with any degree of accuracy. If, on the other hand, the teacher has studied phonetics, he will be able to describe the position of the vocal organs for any given sound, and to detect what is wrong in his pupil's efforts to make the sound. He will be able to supplement this explanation with a number of scientifically devised exercises by means of which the pupil may get that command over his vocal organs which is essential if the positions for making the new sounds are to be arrived at with any accuracy and certainty.

1. Introductory Course, 10–12.

Phonetics.

The use that can be made of phonetics goes considerably further than this. By means of phonetic texts the attention of the pupil can be concentrated on the pronunciation of the new language at the outset, and only when the new sounds have become fairly fixed should he be introduced to the ordinary orthography.

It has been stated, and under certain circumstances it may be quite possible, that by the aid of phonetics a pupil may acquire a better pronunciation than that

of his teacher. The latter knows exactly how each sound is produced ; but having perhaps started the study of phonetics rather late in life, he has not been able to acquire complete command over his vocal organs ; and so some of his sounds may be faulty or uncertain while those of his pupil may be quite correct.

Here it may be advisable to say that perfection is not only practically unattainable, but quite unnecessary. We do not wish our pupils to be mistaken for French boys ; but we do hope that they may readily be understood, and that their pronunciation will not be painfully unpleasant to a French ear.

I would begin with one or two lessons on phonetics in English—a simple description of the speech organs—how voice is produced—the difference between voice and breath—vowels and consonants—diphthongs—the different kinds of consonants, making the pupils find out for themselves the position of the speech organs for several selected sounds.[1] All illustrations should be taken from simple English sounds, with which they are already familiar.

The class should now be shown that some letters do not always represent the same sound, *e.g.* 'a' in *father, fat, fate* ; 's' in *dogs, cats* ; 'th' in *that, think* ; and that the same sound is sometimes represented by different letters, *e.g. reed, read* ; *to, too, two,* &c.

This incompleteness and inconsistency of the Latin alphabet has given rise to the necessity for a phonetic alphabet, in which each symbol represents one sound only, and each particular sound is always represented by the same symbol.

[1] It is to be remembered that the above does not concern pupils young enough for 'nursery French.' Reference will be found, in connexion with Miss Dale's method of teaching reading, on p. 163 above, to a less formal beginning of the study of phonetics by children of a younger age.—[Ed.]

We can now make a start with the French sounds. Either a phonetic chart must be used, or the phonetic symbols must be written up on the black-board. I would advocate the use of a chart, the plan of which should be explained to the class before going any further.

Several lessons will now have to be given up to learning the new sounds and practising them, both individually and in chorus. The most difficult sounds will generally be found to be (*ã*)[1] and (ɔ̃) ; (*y*) the vowel sound in *une*, (*ϕ*) and (*æ*) ; (*e*) and (*ɛ*) ; (a) and (*ɑ*) ; (*r*). In every class there are sure to be some one or two boys who cannot pronounce certain sounds. This is especially the case with (*r*). Such boys must be left alone after a few weeks, unless they can be taken privately. Perfection is excellent as an ideal, but the exigencies of class teaching are such that we can never attain it. I have found more difficulty with (*r*) than with any other sound. About ten per cent. of my pupils have never been able to make it, either with the tip of the tongue (the easier way for English boys) or with the uvula (ʀ). If one had time, this percentage might be reduced by perhaps one-half. This sound is more noticeable than most, as the pupil either makes it or he does not ; whereas with a sound like (*ϕ*), which also presents great difficulty, he may be more or less near it and yet not quite get it, or he may get it one day and not the next.

After the sounds have been practised for some days they must be grouped into words. A text-book in phonetics will now be necessary. For the introductory stage the lessons should be based on pictures, of which there is a considerable choice. Excellent text-books have been prepared, based on series of these pictures.

A good deal now depends on whether the pupils are to write the phonetic symbols or not. Many teachers

[1] Letters in brackets represent phonetic symbols.

are much averse from allowing them to do so, on the ground that it affects their spelling afterwards. I suppose this must be the case to some extent, although I believe that the evil is much exaggerated and that after a year or two all trace of such ill-effects entirely disappears. The chief advantage of writing the symbols is that one is able to give phonetic dictations, which are exceedingly valuable in training the ear. There are other minor advantages, but I consider this the chief one. I would not, however, in any way press the point, as I am sure that excellent results can be produced, and that, for all intents and purposes, a sufficiently good pronunciation can be acquired without the pupils learning to write the symbols. In any case, the pupils should be confined to a phonetic text for at least a whole term. If the symbols are not to be written, the work must be entirely oral for the first term. I do not see any great disadvantage in this. There will be plenty of opportunity of writing later.

Phonetic Symbols.

Most books for beginners have lists of words, each list being an exercise on some particular sound. After several of these lists have been gone through, we shall be able to start with the first lesson in our text-book, returning from time to time to these lists for practice in the more difficult sounds.

The first picture will now be exposed, and probably the first words selected will be the names of some of the persons represented in the picture. Let us suppose them to be Paul, Cécile, Henri, and Marie. Tell the class, in English of course, that you are going to give them the names of the children in the picture. Point to Paul, and pronounce his name slowly and distinctly once or twice, and make the class find out for themselves the

Pictures.

sounds of which the word is composed, *i.e.* (*p*), (ɔ), (*l*). Write on the board the word (*pɔl*) and make the class repeat it several times in chorus, until it is pronounced correctly. A great deal of work should be done in chorus at this stage. Each boy in this way gets much more practice than if he only answered in his turn. It is astonishing how easily, with a little practice, one can detect an incorrect sound, even from among a chorus of voices. It is important that the class should be so arranged that the master can easily walk about amongst the pupils. He can then quickly mark down the offender.

Proceed in the same way with the other names. With a word of more than one syllable, take great care that the division into syllables is correct. Exaggerate the division into syllables by making a slight pause between them, so that there can be no possibility of mistake. Raise the voice slightly at the last syllable, *e.g.* $\overline{\text{se}}$ śil, *ɑ̃* ŕi, $\overline{\text{ma}}$ ŕi, etc. If one does not insist strongly on these points from the very first, they will give much trouble later on. Always correct, as far as possible, every mistake in pronunciation, and give special exercises from time to time on any sounds that may be particularly weak.

After this, point out the children in the picture in turn, making the class supply the names.

The next words in the lesson will probably be *un garçon* and *une fille*. Give the English for these new words, then the French, and proceed in the same way as for the proper names, letting the class find out for themselves the sounds, writing them on the blackboard and then making the class repeat the word several times. After every two or three new words, go back and revise the others.

It will now be necessary to ask some simple questions on the words that have been learnt. The first question

might be, *Qu'est-ce que Charles?* Give the question first in English, then in French, and lastly give the answer in French. The meaning of the answer will be sufficiently evident not to require any translation. Now ask one of the boys the same question, helping him, if necessary, with the answer.

Ask each question several times, with variations if possible. For example, the question, *Qu'est-ce que Charles?* should be repeated for every other child in the picture. In the answers, insist on the liaison, level stress on all sýllables and no lowering of the voice until the last syllable : *e.g.* kɛs kə ɑ̃ ŕi ? ɑ̃ ri ɛ tœ̃ gar sɔ̃́ (Qu'est-ce que Henri ? Henri est un garçon). This lesson should be continued till all the pupils can put and answer the questions without hesitation.

I have given this lesson in considerable detail, as it serves roughly as a model for a great many more. The words once learnt will form the stock-in-trade for all çonversation in class. Gradually more and more French will be used and less and less English. After a certain time, which will vary with the master, but which might roughly be fixed at a month from the beginning, English will no longer be allowed, except in explanations by the master and in translating new words. If one does not adhere strictly to the 'no English' rule, it will soon become a dead letter. There is really no necessity, after a certain stage has been reached, for a pupil ever to use English. If he does not understand, he can say, *je ne comprends pas,* and the master can, if necessary, explain in English. The important thing is that the *pupil* should use no English.

When the first lesson has been thoroughly mastered orally, the pupils may for the first time open their books and read it aloud, very slowly and carefully. If the phonetic symbols are to be written, the exercises can be done at the end of a lesson or during preparation.

It is a great mistake to go too fast, especially at the beginning—a fault into which nearly all of us fall. Nothing pays so much as thoroughness. It gives the class confidence—a most important thing—and lays a sure foundation which will save much time eventually. If one goes too fast, the pupils become discouraged, and will very possibly dislike a subject which they must like and enjoy if they are to do any good at it.

Orthography. No formal grammar is required at this stage. Attention must necessarily be drawn to the difference in pronunciation of certain plural and feminine forms: *e.g.*, lə ʃeval (le cheval), le ʃəvo (les chevaux); grɑ̃ (grand), grɑ̃:d (grande); uvɛ:r (ouvert), uvɛ:rt (ouverte); etc. Some teachers will naturally attach more importance to such points than others would. I think that as much as possible should be left for more careful consideration at a later stage, when the ordinary orthography replaces the phonetic transcript. This change had better be made at the beginning of a new term. The association of certain letters or groups of letters with a particular sound does not present any real difficulty. I have never found that much good results from laboriously explaining that, for example,

> é, er, ez, ai (verbal termination) = (e)
> ais, ait, aient, et (except the conjunction), est = (ɛ), etc.

It is better to tackle the ordinary spelling at once, going through all the work again from the beginning, only much faster, helping the pupils gradually to find out these things for themselves.

More importance must now be attached to the written form of the word, and just as much care must be taken over the pronunciation as before.

Oral Work.

In the early stages, it is a good plan to make the pupil repeat the question before giving the answer; and no answer should be accepted which is not a complete sentence in itself. During the whole of the introductory stage, by far the most important work is oral. This is not because the power of speaking is necessarily our chief ultimate aim (though many would consider it so), but because the power of speaking is more easily acquired at an early age, and because reading and writing can better be learnt in the later stages.

Writing.

More written exercises can now be given. There should be no attempt at original composition for some time yet. The pupils are obviously too young to supply their own ideas; nor do they know French enough for such a difficult exercise. Writing answers to questions on the lesson they have just been doing, and simple grammatical exercises, will be sufficient for them during the introductory stage. Frequent dictations are desirable. These should be taken directly from the lessons previously read and explained in class, without making any changes in the text. The lesson should have been so thoroughly read and explained in class that the best boys will write it from dictation almost without a mistake.

Grammar.

Very little formal grammar will have been done as yet. It will be quite sufficient if by the age of twelve our pupils have a thorough working knowledge of:

(1) The auxiliary and regular verbs (omitting the subjunctive mood). Some few tenses of the commonest irregular verbs.

(2) The ordinary rules for the formation of the feminine and plural of nouns and adjectives; a few common irregular feminines.

(3) The agreement of adjectives and pronouns.

(4) The numerals, cardinal and ordinal (but not all the minute rules for their use).

(5) The partitive article (as simply as possible).

(6) Pronouns (elementary).

The verbs should be practised orally as much as possible, in all their forms, interrogatively, negatively, with subject, with object, etc.

A good way of avoiding the parrot-like repetition of the tenses of a verb is to have printed lists of pronouns as follows:

1.	2.
nous.	vous ?
ils ?	elles. n.
elle. n.	on. n. ?
vous. n. ?	je. n.
tu	tu ?
on ?	nous. n.

The pronoun indicates the person, 'n' means 'négativement,' and '?' means 'interrogativement.' The pupil is then given the tense of a verb to conjugate according to column 1 or 2, *e.g.* le passé indéfini du verbe obéir—première colonne.

nous avons obéi
ont-ils obéi ?
elle n'a pas obéi.
n'avez-vous pas obéi ?
tu as obéi
a-t-on obéi ?

With half a dozen different columns of pronouns, considerable variety can be obtained. Verb drill of this kind will be found very useful, both for oral practice in class and for written work in preparation.

It is much to be regretted that grammarians have

not been able to agree as to the technical terms to be used in their grammars. It leads to endless confusion if one master talks of a tense by one name and another master calls the same tense by another name, or if one master uses the term *complément d'un verbe*, while another master talks of the *régime d'un verbe*.[1] Here surely, is an opportunity for reformers to try to obtain some uniformity where chaos at present reigns supreme.

Uniform Terminology.

All grammar should in the first place be learnt inductively. The various ways of forming the plural and feminine of nouns and adjectives should be discovered by the pupils themselves, from the cases which come under their notice.

Irregularities are sure to be encountered at every turn, as some of the commonest words have irregular forms; but as little stress as possible should be laid on them.

2. The Elementary Course, 12–14.

Now that we are starting a second foreign language (Latin, according to this scheme), it would perhaps be sufficient if five periods a week, not including preparation, were given to French.

The 'Reader.'

During this course the work will be based entirely on a series of elementary readers, gradually increasing in length and difficulty. It is essential that the reader should not be too hard, and that it should comprise a vocabulary of a useful nature. Original texts will often require simplifying; rare words, expressions, and constructions being replaced by more suitable and usual forms. The pronunciation will by this time have become fairly

[1] I have also known the expression *objet d'un verbe* to be employed, although, of course, the word *objet* is not used in this sense in French.

fixed, and will not require such constant attention as before. The treatment of the text gives considerable scope for the skill and ingenuity of the teacher. It is not always easy to ask a number of natural and at the same time simple questions in French on a given passage. If questions are merely read from a printed *questionnaire* in a book, they are apt to seem unnatural to the pupils, and the lesson will soon lose life and interest. Until a master has had a great deal of practice in making up such questions, he should always carefully prepare them beforehand.

Questions.

To begin with, as many questions as possible should be asked on every fresh sentence. The same questions will often need repeating until they can be answered fluently and correctly in French by all the boys in the class. Progress will necessarily be very slow at first ; but the pace will gradually increase, until at the end of the course an elementary reader of thirty to forty pages can be conveniently read in a term.

The method of treating the text at the beginning and at the end of the course will vary considerably.

Treatment of a Text.

At the beginning, one will have as much as one can do to teach the bare meaning of the words, and the elementary grammatical points which can be drawn from the text. As the vocabulary of the pupils becomes more extended, and as their facility in answering easy questions in French increases, one will be able to depart to some extent from the limitations imposed by the text. One word may give rise to a whole group of words, connected either by their derivation or by their meaning. Some of these words may already be known, and should be supplied by the class ; others will be new, and should be written on the blackboard and made the subject of further questions. I will illus-

trate these two methods by showing how I would treat a simple sentence if I were teaching (i.) a class of boys twelve years old, taking a reader for the first time, and (ii.) a class of boys of about fourteen.

Let us take the following as the opening sentence in our text-book: 'Dans le sac d'une ville de Turquie les soldats pillaient la maison d'un riche marchand.'

(i.) The object of the questions in the younger class will be to make the answers emphasise

(*a*) The subject.

(*b*) The verb.

(*c*) The object.

(*d*) The adverbial limitation.

I would therefore ask the following questions:

(1) Qui pillait la maison ?

(2) Que faisaient les soldats ?

(3) Qu'est-ce que les soldats pillaient ?

The answer in each case being the same, viz. 'Les soldats (ils) pillaient la maison,' the word which the question is intended to emphasise should be slightly accentuated.

(4) Quand les soldats pillaient-ils la maison ?

Now repeat questions (1), (2), and (3) with the addition of the words 'dans le sac d'une ville de Turquie.'

(5) Qui pillait la maison dans le sac d'une ville de Turquie ?

(6) Que faisaient les soldats dans le sac d'une ville de Turquie ?

(7) Qu'est-ce que les soldats pillaient dans le sac d'une ville de Turquie ?

As before, the answers to (5), (6), and (7) will be the same, viz. 'Les soldats (ils) pillaient la maison dans le sac d'une ville de Turquie.'

Now ask the question:

(8) Quelle maison les soldats pillaient-ils dans le sac d'une ville de Turquie ?

And finally repeat questions (4) and (5), with the addition of the words ' d'un riche marchand.'

(9) Quand les soldats pillaient-ils la maison d'un riche marchand ?

(10) Qui pillait la maison d'un riche marchand dans le sac d'une ville de Turquie ?

And questions (6) and (7) as they stand, but requiring in each case the full answer—' ils pillaient la maison d'un riche marchand dans le sac d'une ville de Turquie.'

For grammar one could ask a few simple questions such as :

Mettez ' les soldats pillaient ' au singulier, au négatif, au passé défini.

Mettez ' un riche marchand ' au féminin, au pluriel, etc.

When several sentences have been treated in this way the books should be closed, and the leading questions repeated. Then one or more of the pupils should give a résumé of the whole paragraph, and finally it should be read aloud, great attention being paid to pronunciation, liaison, intonation and stress.

(ii.) In the case of a class of older pupils, I would ask some such questions as the following :

Que fait-on dans le sac d'une ville ?

Que faisaient les soldats dans le sac d'une ville de Turquie ?

Pourquoi pillaient-ils la maison d'un riche marchand ?

Quel est le contraire de riche ?

Quelle est la différence entre ' un homme pauvre ' et ' un pauvre homme ' ?

Comment appelle-t-on une petite ville ? Comment

appelle-t-on un habitant d'une ville ? (le bourg, un bourgeois), d'un village ? (un villageois), de la campagne ? (un paysan). Comment appelle-t-on la maison d'un riche marchand ? d'un roi ? d'un paysan ? etc.

Que fait un marchand ? (la marchandise, marchander, le marché, bon marché).

Comment appelle-t-on les habitants de la Turquie ? Quelle langue parlent-ils ?

This gives some idea of the number and variety of questions that may come naturally from the simplest text. For grammar two questions immediately suggest themselves : Pourquoi n'y a-t-il pas d'article devant le mot ' Turquie ' ? Pourquoi ' pillaient ' est-il à l'imparfait ? Then one would compare this use of the imperfect with that of the nearest *passé défini* in the text.

Of course there should be no translation, except in the case of a new word or idiom whose meaning might otherwise remain doubtful.

The pace must be regulated by the capabilities of the class. If, at the end of a lesson the pupils are not able to answer questions on the text without hesitation, either the new words have been insufficiently explained, or else too much has been attempted and the class has not been able to assimilate all the new matter.

Grammar.

Grammar questions should be asked on the text, though care must be taken to avoid, as far as possible, questions that are much beyond the knowledge of the class. Easy subjunctives should be explained (*e.g.* after ' il faut que,' ' quoique ' etc.), and very soon the reason for similar subjunctives will, on their recurrence, be recognised by the class. Anything like a systematic study of the subjunctive mood would, of course, be quite out of place here.

The pupils should at this stage be provided with a grammar—in French—of an elementary type, in which they will find the results of their previous work carefully tabulated and arranged in a convenient form. Such a grammar should be treated as a book of reference, and not as a book from which to acquire fresh knowledge.

Dictation.

For dictation I would give short pieces from what has been previously read in class. After a few terms (or even from the outset, in the case of a good class) I would rearrange the text, using the same words, or other words already learnt, the point being that no new material should be introduced.

This rearrangement can follow the text more or less closely, according to the capabilities of the class. I generally consider that if my best pupils make more than four or five mistakes in a dictation, the piece selected or the rearrangement of it was too difficult. It is better to give dictations which are too easy than dictations which are too difficult. No boy should be asked to write down what he cannot reasonably be expected to understand. If the dictation is too difficult, he will write down hopeless nonsense—a result which, under all circumstances, is thoroughly bad for the pupil, and which, if often repeated, becomes a fruitful source of ineradicable error.

A good example of such rearrangement is given in the 'Special Reports,' vol. iii. p. 508. The text in question is as follows :

Henri VIII, roi d'Angleterre, irrité contre François I^er^, roi de France, choisit pour ambassadeur un évêque anglais. Lorsque celui-ci apprit le sujet de son ambassade et les paroles blessantes qu'il aurait à répéter, il eut peur. 'Pourquoi vous effrayez-vous ?' lui dit le prince, 'si le roi de France osait vous faire le moindre mal, on couperait la tête à tous les Français qui seraient

dans mes états.' 'Très bien, Sire,' répondit l'évêque, 'mais je pense que de toutes les têtes qu'on aurait coupées, il n'y en aurait pas une qui remplacerait la tête que j'ai sur mes épaules.'

Plattner rearranges this text for dictation as follows :

Le roi d'Angleterre Henri VIII, étant irrité contre le roi de France, lui envoya un ambassadeur. Cet ambassadeur, qui était un évêque anglais, avait une mission difficile à remplir. Le roi lui demandait de faire entendre à la cour de France des paroles blessantes. L'évêque eut peur. Il pensait que François I[er] se vengerait en le tuant. Henri chercha à le rassurer : 'Si le roi de France,' lui dit-il, 'touchait à votre personne (à un de vos cheveux) on couperait la tête à tous les Français qu'on trouverait en Angleterre.' 'Ce serait une terrible vengeance,' répondit l'évêque, 'mais de toutes ces têtes pas une seule ne serait préférable à la tête que Dieu m'a donnée.'

In lieu of a composition exercise something more is now wanted than the writing of answers to questions.

'Reproductions.'

Translation from English into French would be much too difficult, and would be quite opposed to the method of teaching here advocated. Free composition would also be impossible. Boys of this age would have neither the ideas nor the vocabulary requisite for such a difficult exercise. It will be necessary, then, to supply them with ideas or subject-matter, and also with the vocabulary needful to express these ideas. A method which can be adopted for boys of this age is the reproduction of a short story which is read to them. Simply to read the story once or twice would, however, not be sufficient. The effort of following the gist of the story and of remembering the words would be too great.

The following is an anecdote read to boys of thirteen

(a class of only moderate ability) and the method of treatment adopted :

Un gros paysan entre un jour, accompagné par sa femme, dans le bureau de poste d'une petite ville de campagne. Il tient à la main une grande enveloppe. Il donne l'enveloppe à l'employé. 'Est-ce que cela va bien, monsieur ?' dit-il. 'Elle pèse trop,' dit l'employé. 'Il faut encore un timbre de dix centimes.' 'Comment, monsieur !' répondit le paysan, 'avec un autre timbre elle pèsera davantage. Je ne suis pas si bête, moi !'

After having read it through twice, I proceed to ask questions. De qui s'agit-il dans ce morceau ? Où entre-t-il un jour ? (il entre DANS le bureau de poste). Qu'est-ce qu'un bureau de poste ? Etait-il seul ? Qu'est-ce qu'il tient à la main ? (difference between à la main and dans la main). Qu'est-ce qu'on met dans une enveloppe ? Qu'est-ce qu'on colle sur l'enveloppe ? &c., &c.

In the course of the questions and explanations enveloppe, peser, pèse, pèsera, davantage, and bête are written on the blackboard. After twenty minutes of such discussion the board is cleaned, and the following 'squelette' is written on it :

—— (entrer) ——, (accompagner) ——, (où ?). —— (tenir) ——. —— (donner) ——.

'—— (aller) —— ?' (dire) ——.

'—— (peser) ——,' (dire) ——. 'Il faut ——.'

'—— !' (répondre) ——, '—— (peser) ——. —— (être) ——.'

The following are the best and the worst reproductions of the above as returned corrected to the pupils :

Un gros paysan entre un jour, accompagné par sa femme, dans le bureau de poste d'une petite ville de campagne. Il tient à la main une   enveloppe. Il

donne l'enveloppe à l'employé. '*Est ce* que SA va bien, monsieur ?' dit-il. 'Elle pèse trop,' dit l'employé. 'Il faut encore un timbre de dix centimes.' 'Comment, monsieur !' répondit le paysan, 'avec un autre timbre elle pèsera davantage. Je ne suis pas si bête, moi.'

Un GROSSE paysan ENTRER un jour accompagné par sa femme dans le bureau de poste d'une petite ville de campagne. Il tient à la main une grande env*elope*. Il la *donna* à l'employé. '*Est ce* que cela va bien,' *dit il*. 'IL pèse trop, monsieur,' dit l'employé. 'Il faut encore un timbre de dix centimes.' 'Comment ,' *re*pondit le paysan, 'avec un autre timbre IL pèsera davantage. Je ne suis pas si bête moi.'

The great point in giving a reproduction of this sort is : (i) To select a piece which is well within the capabilities of the class ; (ii) to worry out the details of the story by means of question and answer ; and (iii) to draw the attention of the pupils to the grammatical points contained in the piece before they are allowed to put pen to paper. Here is another example of this kind of exercise, given to a comparatively worse form of boys of thirteen and a half. I will again give the best and the worst reproductions :

Un ouvrier carrossier, *agé* de cinquante-quatre ans, demeurant rue Fromant, passait hier matin sur le pont de Clichy, lorsqu'il crut avoir le temps de traverser la chaussée devant une automobile qui arrivait à une allure assez modÉRÉ. L'idée était mauvaise, car, accroché par l'un des garde-boue de la voiture, il fut projeté à plus de dix mètres. Relevé, LA *crane* fracturé, le malheureux rendit le dernier soupir comme on le transportait dans une pharmacie.

Un ouvrier *car*ossier âgé de cinquante-quatre ans, demeuRAIT rue Fromant, passait hier matin sur le *pond* de Clichy, lorsqu'il CRÛ avoir le temps de traverser la

chaussée devant *un* automobile qui arrivait à une allure assez mod*e*rée. L'idée était mauvaise, car, accroché par un des garde-boue de la voiture, il fut projeté à plus de dix MÉTRE. RELEVEZ le crâne fracturé, COMME ON rendit son dernier soupir on le transportait dans une pharmacie.

The 'squelette' was as follows :

FATALE IMPRUDENCE

—— 54 ——, (demeurer) —— Fromont, (passer) —— Clichy, —— (croire) —— (traverser) —— (arriver) —— allure ——. —— (être) ——, car, (accrocher) —— garde-boue ——, —— (projeter) ——. (Relever), —— (fracturer), —— (rendre)—— (transporter) —— pharmacie.

There seem to me to be several advantages in this class of work. Even when badly done, as in the last case, there is a certain flavour of French about it, and the best boys write what is distinctly French. I have not given an example of what can be done by a really good class, after a year or more at this kind of work. I have had pieces twice the length of either of those given, and much more difficult, written out with hardly a mistake. The lesson in no case exceeds three-quarters of an hour, which would give twenty minutes for discussion and twenty minutes for writing such a reproduction. Another great advantage is the satisfactory way in which this work can be corrected. Of course, the exact words are not required, but nothing must be left out, and the 'squelette' practically ensures the same words being used.

The 'Reader,' as before, forms the basis of the work in the Junior Course. The texts will be longer and increasingly difficult, a larger portion will be read during a lesson, and the questions will be of a more general

nature. At this stage pupils should be provided with a dictionary in French, such as Larousse or Gazier; they will have to be taught how to use it at first. Translation, as before, should only be used as a last resort.

3. The Junior Course, 14–16.

With more rapid reading, constant revision of new words and idioms becomes more necessary. I say 'more necessary' because revision is dull work, and the temptation to hurry on with the story is very great. I am sure, however, that revision is very important. What is only half-learnt is soon forgotten. Of course, all new words are not of equal value. All unusual or technical expressions can be dismissed with a bare explanation; only such words as belong to common usage should be underlined in the text and revised periodically.

Texts.

Preparation should consist largely of revision work of this kind, together with writing answers to questions on the text that has been previously read, exercises on grammar that has been explained, or learning by heart a piece of prose or poetry that is already familiar to the class; in fact, as a rule, no new ground should be broken in preparation.

Grammar must now be treated rather more seriously. The same elementary French grammar as was used before should still be sufficient. Some persons seem to have a rooted aversion to grammar in any shape or form; but the systematic study of grammar seems to me to play an indispensable part in the learning of a language. Verbs, for example, must be thoroughly learnt. I know of no better way than that of learning the principal parts by heart, as one does in Latin. When once these 'temps primitifs' are known, the whole verb can be conjugated by rule of thumb. For example, take the verb 'vivre':

Grammar.

The Verb.

Infinitif	Participe Présent	Participe Passé	Présent de l'Indicatif	Passé Défini
vivre	**vivant**	**vécu**	**vis**	**vécus**
Futur **vivr | ai** **as** **a** **ons** **ez** **ont**	Pluriel du Présent de l'Indicatif **viv | ons** **ez** **ent**	Tous les temps composés. Passé Indéfini **j'ai vécu**	Singulier du Présent de l'Indicatif **vi | s** **s** **t**	Passé Défini **vécu | s** **s** **t** ^ **mes** ^ **tes** **rent**
Présent du Conditionnel **vivr | ais** **ais** **ait** **ions** **iez** **aient**	Imparfait de l'Indicatif **viv | ais** **ais** **ait** **ions** **iez** **aient**		Singulier de l'Impératif **vi | s**	Imparfait du Subjonctif **vécu | sse** **sses** ^ **t** **ssions** **ssiez** **ssent**
	Présent du Subjonctif **viv | e** **es** **e** **ions** **iez** **ent**			

There are only twenty verbs in the French language, not counting a few rare and defective ones, that do not form their tenses regularly according to this scheme; and in these twenty verbs the only variation comes in one or more of the three following cases:

(i) Futur et Conditionnel.
(ii) Présent de l'Indicatif.
(iii) Présent du Subjonctif.

Of course, the terminations must be known; but these are the same for all verbs, except in the singular of the present indicative and in the past definite. There is no royal road to the mastery of the verbs. Even for French children a certain amount of grind is necessary, so we cannot hope to escape it altogether.

The uses of the subjunctive mood also must now be studied more systematically; and, in general, the pupil's knowledge on all the more important grammatical points, which up to now has been picked up in a more or less haphazard way, must be rounded off and completed as far as possible.

In order to ensure that this will be thoroughly done, and to avoid unnecessary overlapping in different classes, a grammar scheme should be drawn up for the whole course.

The dictations should be made rather more difficult. The following exercise will provide an excellent lesson.

Dictation. A piece which the class has never seen in print may be given as a 'dictée expliquée.' The piece is first read and then discussed, and explained much in the same way as for a reproduction, and finally dictated.

The new language during this stage will be Greek or German, and in either case it should be the last new language to be studied at school.

German. At the commencement German will require from four to six lessons a week. The method

to be adopted will, in all essential points, be the same as for French.

Only a very few lessons need be spent over phonetics, as most of the German sounds are the same as the French ones. Of the new sounds to be learnt (η), (h), (ι), and (υ) are already familiar to an English boy, and there only remain (?), (ς), (x), and (y). These four sounds and a few important points, such as the de-vocalisation of final voiced consonants, will be easily learnt after the training the pupils will have had in French phonetics.

Bühnenaussprache (the pronunciation of the theatre) should be taken as the standard pronunciation, and all dialectic peculiarities, such as the Hanoverian *st*, *sp*, must be avoided. Prof. Viëtor, in 'Die Aussprache des Schriftdeutschen,' says: 'People who know very little about it generally think it easy enough to acquire a correct German pronunciation from the ordinary spelling and the indications contained in any German school grammar, or, at all events, with the aid of a native, if possible, Hanoverian teacher. Those who have looked into the matter more closely are, on the contrary, inclined to consider it a hopeless case to try to arrive at reliable results, where there seems to be nothing but uncertainty and contradiction amongst the Germans themselves. . . . Neither of these views is correct, but, with some care and good will, a standard German pronunciation may indeed be pointed out to, and acquired by, English learners of our language.'

Again, 'English students of German, and English people in general, have put this question (where the best German is spoken) over and over again to the Germans they had nearest at hand—viz. the Hanoverians—and, naturally enough, they have just as many times been told that the best German is spoken in Hanover. What could they do but believe it?

Yet it is a fact worth knowing that in Germany this belief is held only by the Hanoverians themselves.'

'The language of the theatre must be taken as the standard of German pronunciation.'

The systematic study of grammar should be begun much earlier than was the case in French, and in general it must be remembered that the pupils are older and more skilled in the art of language learning than they were when they began the study of French. Much more rapid progress will consequently be made.

4. The Senior Course, 16–18.

By the time he has reached the fourth stage the pupil should have a sound working knowledge of the accidence and syntax of the language. He will not have burdened his mind with unusual grammatical forms rarely to be found in any modern author. He will command a considerable vocabulary of ordinary words; his pronunciation will be sufficiently good for all practical purposes; and he will be able to understand French when spoken. He will be able to read an ordinary French text with ease, and without translating it; he will be able to write quite grammatical and idiomatic French of a simple nature, dealing with simple subjects. A boy leaving school at the age of sixteen should have learnt much that will be of considerable use to him; and he should have laid a sound foundation for the further study of the language abroad, or even in England, if he wishes to continue it. What has been learnt will be so well known and of such a nature that it will not be readily forgotten.

In the final school stage (it must not be forgotten that the *final* stage is the university stage—that the school stage does not complete one's study of a modern language any more than that of Latin or Greek) a good deal remains to be done. The texts chosen should, of course, be still more difficult. I would choose a fresh

author for special study each term. The works selected should be as varied as possible. The treatment of these authors could be made simple or elaborate, according to the capabilities of the class. Certain passages in the text could be taken for very careful treatment, but a good deal would be read rapidly, either aloud in class or by the pupils privately. The aim during the whole of this period should be to create literary taste and to stimulate interest in the author, and, through him, in the people and in the language.

Much can be done by a good teacher with boys who have been properly prepared. Composition should now take the form of an essay, or the development of a subject of which the outline can be given, or even discussed in class. There would be no harm now in translating from English into French ; in fact, it would be desirable to do so. I do not see any advantage to be gained *for French* by systematic translation from French into English. I know of more than one school in which translation from French into English is taken by the English master in the English lesson, for the sake of the practice in English, with satisfactory results.

It seemed advisable to devote the major part of this section on the teaching of modern languages to those earlier stages during which the stress of the work properly falls upon the more purely linguistic side of the teacher's task. But that side finds its necessary complement in the literature of the foreign tongue. This is true in respect of schools of all kinds ; an English boy who has no associations of moment with the names of Molière or Hugo, Goethe or Schiller, can scarcely be said to have learned French or German to any sufficient purpose. In schools where Latin or Greek forms no part of the curriculum, humanist education, so far as that depends upon the study of letters, can only

be derived from the classics of the vernacular and other modern languages.

In these schools more especially, the choice of authors and of texts for the pupils' reading during the senior stages ought to be made with a full sense of the responsibility which this fact entails. For obvious and quite defensible reasons, the Reform Method avails itself largely of the writing of to-day; but a certain facility in the use of the French and German of the hour will not compensate for a blank ignorance of masterpieces. An Englishman who discovers a class of German boys under the guidance of their accomplished master, working over 'Three Men in a Boat,' as if it were a sacred text, is in a quandary between a desire to be fair to Mr. Jerome and his sense of the fitness of things. We may well spare our foreign *confrères* such an experience.

Examinations are the great obstacle in the path of the reformer. Until a great change in this direction takes place there is little likelihood of any notable improvement in modern language teaching. An oral test *must* form an essential part in any modern language examination. The power to understand and to speak a modern language cannot be persistently ignored as an integral part of the instruction in that language, and if time is to be devoted to it, proficiency in this branch of the subject must meet with proper recognition at the hands of the examiner.

Examinations.

It is not only this lack of an oral test which reacts so disastrously on modern language teaching. The written test is often far from satisfactory. It is not an easy matter to set a paper which will satisfy everybody, but I venture to end this chapter with four specimens of French examination papers, one for the end of each of the stages which have been described. I claim for these papers no great originality, but I think that a

boy who has been properly taught would have no difficulty in doing them; and also that any boy who could do them reasonably well would, in the end, really possess a satisfactory knowledge of the language.

1. *Examination Paper for the end of the Introductory Course. Pupils aged* 12.

I. Lisez ce morceau avant de répondre aux questions :—

Amédée était un jeune Français. Il n'avait que six ans et demi, mais il savait déjà lire, écrire et calculer passablement. La seule chose à lui reprocher c'était son humeur querelleuse. Il cherchait souvent dispute à ses camarades, et se battait pour les motifs les plus frivoles.

Un jour, ayant vu passer un régiment, il demanda à son père pourquoi ces hommes se promenaient ainsi dans les rues avec de beaux habits et des fusils sur l'épaule.

— Ces hommes sonts des soldats, lui répondit son père; ils sont chargés de nous défendre, si des hommes d'autres pays nous attaquaient. Tu les vois passer quand ils se rendent au Champ-de-Mars, où ils font l'exercice tous les matins, pour s'accoutumer à marcher en ordre et à se servir adroitement de leurs armes.

— Et ceux qui n'ont que des sabres? demanda Amédée.

— Ce sont les officiers qui commandent la troupe.

— Ah ! papa, que je voudrais être officier !

(1) Quel âge Amédée avait-il?
(2) Etes-vous plus jeune que lui?
(3) Qu'est-ce qu'il faisait déjà passablement?
(4) N'avait-il pas un défaut?
(5) Quels étaient les motifs pour lesquels il se battait?
(6) Que vit-il un jour?
(7) Qu'est-ce qu'il demanda?
(8) A qui le demanda-t-il?
(9) Qui est-ce qui lui répondit?
(10) Qu'est-ce qu'il lui répondit?
(11) Pourquoi y a-t-il des soldats?
(12) Pourquoi ces soldats se rendent-ils au Champ-de-Mars?
(13) Quelle arme le soldat porte-t-il?

(14) Qui est-ce qui porte un sabre?
(15) Donnez le contraire de : souvent, beau, en ordre, adroitement.

II. Mettez au pluriel :—
(1) Son aimable enfant.
(2) L'officier monta sur le cheval.
(3) Cette maison est très belle.
(4) J'ai vu votre fils.

III. Mettez au féminin :—
(1) Un homme laborieux.
(2) Ce chien fidèle.
(3) Mon frère aîné.
(4) Un prince allemand.

IV. Remplacez par des pronoms les mots en italiques :—
(1) *Amédée* avait vu passer *un régiment.*
(2) On lui reprocha *son humeur querelleuse.*
(3) Ils se rendent *au Champ-de-Mars.*
(4) Ils se servent *de leurs armes.*

V. 'Il a des pommes.'
Dans cette phrase, introduisez les mots :—
(1) beau
(2) rouge
(3) beaucoup
(4) ne . . . . pas
(5) combien?

VI. Ecrivez en toutes lettres :—
25, 51, 71, 80, 101.

VII. Mettez au présent et à l'imparfait de l'indicatif :—
il eut, je vendis, tu demandes.
Au futur, au passé défini et au passé indéfini :—
nous sommes, ne cherchent-ils pas?
saisissez-vous?

VIII. Dictée :—

Alice était une jeune Française. Elle avait sept ans, mais elle ne savait encore ni lire ni écrire. Un jour elle vit passer

des soldats, et elle dit à sa mère : 'Maman, pourquoi ces hommes marchent-ils ainsi dans les rues et qu'est-ce qu'ils portent sur l'épaule ?'

Sa mère lui répondit que ces hommes étaient des soldats, qu'ils étaient chargés de défendre la patrie si les hommes d'autres pays l'attaquaient, et que les armes qu'ils portaient étaient des fusils.

The oral examination should consist of :—

(i) Reading aloud a few lines of easy French.

(ii) Questions on the work of the course.

In the reading test, high marks should be given for pronunciation, intonation, etc., as well as for fluency.

2. *Examination Paper for the end of the Elementary Course. Pupils aged* 14.

I. Lisez ce morceau avant de répondre aux questions :—

Y a-t-il un animal plus malheureux et plus tourmenté que moi ? Les chiens et les chats, qui ne sont pas laborieux, sont bien mieux traités que moi. On m'accable des travaux les plus durs et les plus pénibles. Tantôt on charge mon pauvre dos de paniers pleins et comblés de légumes et de racines ; on y met parfois, je crois, des cailloux et du fer, tant le poids est lourd. Tantôt c'est un énorme sac de blé ou de farine qu'on y installe. Tantôt on m'attelle à une voiture lourde, et toujours : Va, trotte, mon pauvre baudet !

Et voici maintenant les gentillesses de mes maîtres et de leurs valets : ils me poursuivent de moqueries et d'injures, et mes oreilles, les plus belles que possède aucun animal, les font rire ! Ah ! je suis un être bien malheureux !

(1) Quel est cet animal malheureux ?
(2) Quelles sont les qualités de cet animal ?
(3) Quel est son principal défaut ?
(4) Pourquoi son nom adressé à une personne est-il une injure ?
(5) De quoi cet animal ce plaint-il ?
(6) Pourquoi les chiens et les chats n'ont-ils pas le droit d'être mieux traités que lui ?
(7) De quelle espèce de travaux l'accable-t-on ?
(8) A quoi servent les paniers dont on charge son dos ?

(9) Pourquoi croit-il qu'on y met parfois des cailloux et du fer ?
(10) Qu'est-ce que le fer ? Qu'est-ce qu'un caillou ?
(11) Que fait-on avec de la farine ?
(12) Pourquoi attelle-t-on à une voiture l'animal dont il s'agit ?
(13) Qu'est-ce qu'il croit avoir de très beau ?
(14) Pourquoi s'en moque-t-on ?
(15) Donnez le contraire de : malheureux, laborieux, plein, lourd, pénible.

II. Mettez au pluriel :—

(1) Y a-t-il un animal plus tourmenté que moi ?
(2) Un énorme sac de blé.

Mettez au féminin pluriel :—

(3) Je suis un paysan bien malheureux.

Mettez au singulier :—

(4) Les gentillesses de mes maîtres et de leurs valets.

Mettez au féminin :—

(5) Les chiens et les chats sont mieux traités que lui.

III. Mettez les verbes entre parenthèses au temps voulu :—

(1) Il désire que nous (partir).
(2) Quelle faute ai-je (commettre).
(3) Je voulais qu'il (partir).
(4) Il nous a (obéir),
(5) Nous nous sommes (laver).
(6) Il est possible qu'il le (savoir).
(7) Il vous a (écouter).
(8) Voilà la maison que j'ai (acheter).
(9) Bien qu'il (être) habile, il ne réussira pas.
(10) Quand nous (dîner), nous partirons.

IV. Mettez *au présent de l'indicatif*, *au futur et au passe défini* :—

Vous faisiez, qu'ils aillent, il a tenu, nous réussissions.

Au passé indéfini et au présent du subjonctif :

Tu allas, nous vînmes, il eut, ils peuvent.

V. Remplacez par un adjectif les mots en italiques :—

(1) Cet homme *n*'est *pas heureux*.
(2) Ce mot *n*'est *pas correct*.

(3) Les dieux *ne* sont *pas mortels.*
(4) A Paris il y a un chemin de fer *sous la terre.*

VI. Remplacez les mots en italiques et les tirets par des pronoms :—

(1) *Jeanne et Marie* parlent *à Paul.*
(2) Parle *à Pierre*, *Madeleine.*
(3) *Charles* est sorti avec *Marguerite et Georges.*
(4) "Aimez *Georges*" dit *Georges.*
(5) Parlons *de l'affaire.*
(6) Je réfléchirai *à ce que vous me proposez.*
(7) La plus grande cloche de l'Europe est *la cloche* de Moscou.
(8) La cloche —— on parle est très célèbre.
(9) La chaise sur —— vous êtes assis est cassée.
(10) C'est un homme en —— j'ai beaucoup de confiance.

VII. Dictée :—

Parmi les animaux en est-il qui soit plus malheureux que l'âne? Le plus grand nombre des animaux domestiques qui cependant font moins de travail et rendent moins de services sont mieux traités que lui. On les caresse, on les comble de douceurs de toutes sortes ; ils sont considérés comme des frères de l'homme. L'âne, lui, ne reçoit guère que des coups quand il porte de lourds fardeaux ou traîne des charrettes pleines de sacs, de pierres ou de racines.

Pour le récompenser des services qu'il rend, on injurie ce courageux et patient animal, on se moque de ses oreilles, de son peu d'intelligence.

Est-il, sous le ciel, bête de somme plus maltraitée ?

VIII. Reproduction. A simple anecdote should be read aloud twice, slowly and distinctly. The pupils will reproduce the story with the help of a 'squelette.' The 'squelette' should be rather a fuller one than would be the case if the reproduction were to be done in class, after discussion.

IX. Oral examination.

3. *Examination at the end of Junior Course. Pupils aged* 16.

I. Texte à étudier.

Alexandre Dumas avait parfois des mots d'une grandeur royale. S.A.R. le Duc d'Orléans avait réservé une soirée

par semaine pour s'entourer des artistes les plus éminents. Ces réunions furent d'abord charmantes d'intelligences à l'aise et de comme il faut sans gêne. Mais peu à peu les peintres et les littérateurs de second ordre se mêlèrent à ces assemblées, qui se grossirent de sabres, d'épaulettes et d'habits galonnés. Les arts s'envolèrent. Un soir, Dumas arrive au Pavillon Marsan. Il se trouve à l'entrée des salons en compagnie de commandeurs, de grands-officiers et de grands-croix ; il était le premier arrivé. Un huissier de service, sans doute un débutant, lui demande son nom et ses qualités ; c'était la consigne.

'Annoncez Alexandre Dumas.'

L'huissier paraît chercher un instant dans sa mémoire et dit ensuite, avec un dédain très marqué :

'Homme de lettres ?'

'Gentilhomme de lettres,' répliqua le maître avec une hauteur souveraine. Et le mot 'gentilhomme' fut crié à la porte, et Alexandre entra.

(1) Quelle était la profession d'Alexandre Dumas ?
(2) Quel est le mot de 'grandeur royale' prononcé par Alexandre Dumas ?
(3) Ecrivez en entier : S.A.R.
(4) Combien de fois par semaine le Duc d'Orléans recevait-il des artistes ?
(5) Recevait-il tous les artistes indistinctement ?
(6) Quel fut, au début, le caractère de ces receptions ?
(7) Expliquez l'expression 'sans gêne' et donnez un synonyme de 'mettez-vous à l'aise' en vous servant du verbe 'gêner.'
(8) Auriez-vous préféré faire partie des réceptions initiales ou de celles qui eurent lieu plus tard ? Expliquez votre préférence.
(9) Les véritables artistes assistaient-ils aux soirées du Duc, quelques mois après leur création ?
(10) Pourquoi les arts s'envolèrent-ils ?
(11) Quel est le grand artiste qui se présenta cependant, un beau jour, pour être reçu ?
(12) Où le Duc d'Orléans habitait-il ?
(13) Alexandre Dumas était-il en retard lorsqu'il se présenta chez le Duc ?

(14) Y avait-il longtemps que l'huissier qui lui demanda ses noms et qualités était au service du Duc ?
(15) Expliquez le mot 'consigne.'
(16) Quel est le rôle de l'huissier qui se tient à la porte des salons ?
(17) Quelle différence faites-vous entre 'homme de lettres' et 'gentilhomme de lettres.'
(18) Qui donc avait, dans le texte à étudier, droit à ce titre de 'gentilhomme' ?

II. A few questions on grammar might be added, on similar lines to those given in the other papers.

III. Dictation—unseen.

IV. Reproduction, with the aid of a 'squelette,' of a short story read aloud twice by the examiner.

V. Oral examination.

4. *Examination at the end of the Senior Course. Pupils aged* 18.

I. The questions should not be based on any particular text, but should be of such a character as to test the pupil's knowledge of the books he has been reading during the course his appreciation of their literary merits, and the leading characteristics of the authors studied. The answers (written of course in French) to these questions would often be of considerable length.

No questions on grammar need be set.

II. Either

(1) The reproduction of a story read aloud twice, without any further help, or
(2) A short essay on one of two or three subjects.

III. Dictation.

IV. Oral Examination.

FOR FURTHER READING.

Board of Education. *Special Reports on Modern Language Teaching.* Wyman & Sons, Ltd., 1899. 6½*d.*

Otto Jesperson, *How to Teach a Foreign Language.* Swan Sonnenschein, 1904. 3*s.* 6*d.*

Karl Breul, *The Teaching of Modern Foreign Languages in our Secondary Schools.* Cambridge University Press, 1906.

H. Breymann, *Die neusprachliche Reform Literatur von* 1899–1904. Leipzig, 1905. 4*s.*

H. Sweet, *Practical Study of Languages.* J. M. Dent & Co., 1899. 6*s.*

W. H. Widgery, *The Teaching of Languages in Schools.* London, 1888.

W. Viëtor, *Die Sprachunterricht muss umkehren!* Heilbronn, 1884, &c.

H. Sweet, *Primer of Phonetics.* Oxford, 1890.

W. Viëtor, *Elemente der Phonetik.* Leipzig, 1893.

P. Passy, *Les sons du français.* Paris, 1897.

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